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Improved Magnetic Combination Lock.

Ever since the achievements of the celebrated Hobbs, in opening the Chubb's and other famous locks at the great London Exhibition, our mechanics have vied with each other in the production of a burglar-defying lock. An unpickable lock is a difficult thing to manufacture. Perhaps the combination locks which use no keys are the only description of fastening which defy successfully the burglar's art. Some locks can be forced, others blown up, and others, again, opened by tampering with their machinery. In combination locks, having several independent tumblers, which must each be in a certain position to allow the bolt to be moved, there is a chance of picking them by the use of the micrometer, a delicate instrument which shows the movement of the one-thousandth part of an inch. By means of this contrivance the burglar can detect the slightest movement of the catch when the tumbler comes opposite it. It is impossible to make these tumblers so perfect as not to show, in some degree, when the catch and one of the tumblers come in opposition.

The lock which is herewith illustrated, by the use of a powerful magnet, renders a test by the micrometer absolutely impossible. It has no key, and the knob is neither drawn out nor thrust in while locking or unlocking. Fig. 1 shows the interior of the lock, the bolt being in position of locked. A is the bolt, which is a cylindrical disk of brass rotating on the pivot, B. C is a slide, guided by the screw, washer, and slot, D, and in combination with the arm, E, moves the bolt. This arm, E, has a catch, F, which engages with the dog, G, that rotates with the tumblers, H—better seen in Fig. 2—and is attached to the shaft of the knob, I, Fig. 2. This

Fig. 2

dog is secured to the stem of the knob by a yoke, J, fastened by screws against the flattened side of the stem.

K is a horse-shoe magnet, hung on a pivot above the tumblers. When the bolt is turned, or locked, the arm, E, is lifted by the disk of the dog, G, sufficiently to bring the armature on the end of the arm, E, within the attraction of the magnet, which then retains it above the dog and keeps its catch from falling into the recess on any one of the tumblers. Thus it will be seen that no dropping of the arm will denote the coincidence of its catch with a tumbler, so that picking by means of the micrometer is impossible. All of the tumblers must be in the position to which they are set before the magnet will allow the arm to drop. By means of the scale on the flange of the knob, I, one million of combinations may be made, and they can be changed in a moment by means of a key introduced from the inside of the lock through the tumblers, H. The shaft of the knob is made of hardened steel and soft iron. The outside is soft, and from five-eighths of an inch inside the face of the safe door, is of hardened steel. In case of violence to the knob the shaft would yield at the point of junction, leaving the shaft proper beyond the reach of the burglar's tools.

Fig. 1

SARGENT'S MAGNETIC SAFE AND BANK LOCK.

This lock has no springs, no delicate parts to get out of order, the combinations are readily changed, and defy discovery. Without the magnet it is a very superior lock—with it, it is claimed to defy picking. There are no keys to be lost or mislaid.

It is the subject of four patents dated May 2 and 23, 1865, and June 9, and Aug. 28, 1866. For further information address James Sargent, patentee and manufacturer, Rochester, N. Y.

Method of Lighting Theatres.

In a number of the "Revue Encyclopedique," published in 1825, we find the following description of a plan then in use for lighting a Venetian theatre. By the aid of parabolic mirrors, the light of many lamps is concentrated over an opening made in the middle of the ceiling of the theatre, and reflected down on a system of plane concave lenses, of a foot in diameter, which occupy the aperture, and convey into the theatre the rays of light which arrive at the lenses parallel and depart thence divergent. From the pit alone are the lenses seen, and although the luminous focus is sufficient to light the whole of the theatre, it does not dazzle, and may be viewed without fatiguing the eyes. Beside the advantage of being more equal, and mild as that of a single luminous body, the light is more intense than that of the ancient luster, and, moreover, occasions neither smoke nor bad odors.

Heating Railway Trains.

A correspondent, in writing on this subject, advocates the heating of railway passenger trains by steam pipes leading from the boiler of the locomotive, urging as a reason of preference for this method, that in heating by stoves one part of the car, the middle, is in the polar regions, while the ends, or that where the stove is located, is within the tropics. He alludes also to the danger of fire by the overturning of the stove in case of accident by collision or otherwise.

The plan proposed is not new. It was projected many years ago, but there are great objections to its practical application. The boilers of locomotives are not calculated to make steam enough to spare "live" steam for such a purpose, and the exhaust steam would scarcely be sufficient to heat a train of six, eight, or twelve passenger cars. A portion of the baggage or mail car of a train might be devoted to the location of a furnace for this purpose; but if steam was the medium employed for heating, it would suffer much loss by condensation in passing between the cars through the flexible tubes, and if hot water was used it would be subject to the same deterioration, though perhaps in a less degree, and would hardly furnish heat enough for a large car.

It would seem that railway cars should be heated by independent furnaces, so that each car should have its own source of warmth. To the stoves now in use, or to some constructed the the purpose, reservoirs of water, it appears, might be attached, which, by a system of pipes, would distribute the heat equally throughout the car. If some simple method of this sort was devised, there is no doubt it would be speedily adopted on our railroads. We hope our inventors will set themselves to work to invent some better means of heating cars than those now in use.

A Singular Quality in Steel.

A correspondent, E. P. W., says that he was informed by a practical mechanic, that having made a spatula, or pallet knife, such as is used by artists, and tempered it to the blue, or spring temper, he ground and polished it, when it became as soft as before tempered. Considering it worthless, he laid it one side for a time, but one day he held it over the fire, in thoughtlessness, until it was blued, when he found it had regained its original elasticity.

The fact may be new to some of our readers, although we were practically acquainted for years with this quality of steel, at least of steel of some grades. We believe, however, that cast steel, generally, when brought to the blue temper, loses some of its elasticity if the blue is removed from the surface. Why, we do not profess to determine, but the experience of many workers in steel will confirm our own.

THE Colt's Fire-arms Company, at Hartford, have received orders from the Russian Government for 100,000 Laidley breech-loaders, which are said to be more efficient and destructive than the Prussian needle-gun.

ABATTOIR FOR NEW YORK.

The weekly supply of live stock that finds its way from the States of Indiana, Ohio, and other States of the West, to the New York markets, exceeds 6,000 cattle. The slaughter houses for preparing this supply for market, by order of the Board of Health have been removed during the past season to the environs of the city, yet here they have been a constant source of annoyance, and the community must welcome any plan by which this seemingly necessary evil can be dispensed with.

On Wednesday, the 17th inst., we were present at the formal opening of the Abattoir of the New Jersey Stock Yard and Market Co., located in the village of Communipaw, on New York Bay.

Although a new project in this country, such establishments have long been known in Europe. Paris, of all cities, is best provided with these sanitary institutions, yet the pioneer enterprise of this country equals in capacity the six abattoirs of that city combined.

The systematic division of labor, the use of mechanical appliances to supersede manual labor, and the utilization of what has hitherto been considered refuse matter, are advantages which are attained in this immense establishment, and which must exert an influence that will be appreciated by the public, in lowering the present high rates for all animal food.

The buildings of this company are in direct railroad communication with the whole country, and stock can be immediately transferred from the cars to the pens, where it is examined, bought, and sold. The two principal buildings situated at right angles with each other, are known respectively as the storage and slaughter houses—the former being 540 by 100 feet, three stories in hight; the latter 360 by 90 feet, and two stories high.

One of the leading features of the establishment is the humane care taken of the animals previous to slaughtering. The feverish state in which they are taken from the cars is allayed by time, and a plentiful supply of food and water, and the evil effects of meat killed in this diseased state are thus overcome. The care taken, also, to thoroughly warm and ventilate the buildings, is an outlay to the company that will benefit the public health.

The store house has pens sufficient to easily contain 45,000 sheep and hogs, the neat cattle being stalled in other buildings. The slaughter house has hanging room for 6,000 hogs. The process of killing and dressing is speedy and efficacious. On the lower floor 1,200 cattle daily can be readily prepared for market, and even this number can be doubled if occasion demanded, affording a supply sufficient for the New York markets for three and a half days. The hogs are driven up to the second story, struck on the head with a sledge hammer, thrown into a vat of boiling water, the bristles thoroughly removed, cleaned, and swung off on portable gambrels, in the short space of seven minutes each. The time occupied in dispatching neat cattle is nearly twenty minutes per head. Sheep are handled at the rate of 3,000 daily. Means are employed for condensing the poisonous vapors, and preserving the purity of the surrounding atmosphere. A capacious ice house at the end of the slaughter house will keep the meat fresh during the summer months. We heartily congratulate the much-abused citizens of this city upon the prospect of getting rid of the driving and slaughtering of animals within city limits, a very barbarous custom which has too long prevailed.

The Calcium Light in War.

Science is the servant of war, as well as the handmaid of peace. Brute force in modern wars occupies but a secondary position as an agency in determining results, science and mechanical appliances taking the initiative and leading the hosts. This is finely illustrated in some statements made by Prof. Henry Morton, before the Franklin Institute, of which he is secretary. He says on page 280 of the *Journal*:—

The front of Fort Wagner, toward which the advances of the United States forces were made, was about 700 yards in length, while the approaching saps were confined to a narrow strip of solid land about 50 yards across, the rest of the fort being covered by a swamp on one side and the ocean on the other. For this reason, when the head of the sap had been pushed to within 200 yards of the fort, further advance was rendered impossible, because the zig-zags would be enfiladed from one side or another by the guns at the extremities of the fort.

It was under these conditions, no advance having been made for several days, and the loss in the trenches being very heavy, that the calcium lights were first tried. Two of these, with jets 1-18th of an inch in diameter, burning about 14 cubic feet of gas per hour, were set up at the extreme left of the second parallel, about 750 yards distant from the fort. These jets were supplied from large reservoirs 15 inches by 8 feet, each capable of holding 250 cubic feet. Both the gases were made on the island in a laboratory established for the purpose, where a detail of 20 soldiers and 12 negroes was constantly employed in the manufacture and compression of the gases for use in various ways connected with the military operations at this point, such as the prevention of blockade running at night, of sending supplies and troops to Fort Sumter, etc.

The two lights above mentioned were so arranged with parabolic mirrors as to throw sectors of light, one over one-half of the fort and the other over the remainder, the field of light being sharply cut by a diaphragm so as not to reach below the edge of the parapet. The effect of this was to make every motion, and each figure on the rebel works, perfectly clear to those in the trenches, while the space below, from the ditch of the fort to the saps and parallels, was hid in impenetrable darkness.

The Union riflemen and sharp-shooters, in fact, were able to leave the protection of their works with impunity, while, on the contrary, all the gunners in the fort were exposed to a deadly fire. The consequence was, that, within twenty minutes after starting the lights, the fort, from which a constant fusilade had been kept up ever since the darkness set in, was absolutely silenced, and remained so during the night.

Advantage was, of course, taken of this condition to push forward the sap, and by the end of the second night such progress had been made that the eastern angle of the fort was entered, and the work becoming no longer tenable, was abandoned by its garrison. Of course, every available gun was brought to bear upon the lights from the neighboring batteries, but their dazzling points seem to have been very hard objects to aim at, for though some of the reservoirs were hit by fragments of shell, and still bear the dints so inflicted, the apparatus was never seriously damaged.

A New Method of Generating Gas.

A patent was recently issued to J. H. Connelly, of Wheeling, Va., for the manufacture of illuminating gas by introducing petroleum or its residuum into the retorts, with lime water, when charged with coal, producing thereby more gas with two retorts than can be produced in the same time with three, when coal alone is used in the ordinary way.

By this process, it is claimed, gas can be produced from thirty to forty per cent less than from coal alone. By using one-half coal and one-half residuum and lime water, it requires but one-third the amount of lime for purifying, and the percentage of gas is greatly increased.

This plan can be employed on a small scale for economically generating gas for dwellings or manufactories not reached by the city gas, either in connection with coal, or with residuum and lime water alone, thereby dispensing with lime as a purifier altogether. This plan has been in successful operation for some time in Wheeling, and has been pronounced by practical gas engineers of several cities, as a complete success, on the score of economy, freedom from the possibility of explosion, and superiority of illuminating power.

A New Kind of Gunpowder.

A series of experiments to test the qualities of M. Gustave Neumeyer's new gunpowder have just taken place. The property of this gunpowder consists in its not exploding unless subjected to a strong pressure. Its ingredients are the same as those of the common sort, but the proportions are probably different, a circumstance which, of course, is the inventor's secret. M. Neumeyer makes four kinds of gunpowder, viz: one for ordnance, another for muskets, a third for fowling pieces, and a fourth for mining purposes. The first three are granulated, but the fourth is a very fine powder. A certain quantity of the other sorts were set fire to in the open air; it burnt away with a fizzing noise like that of sulphuric acid dropped on a brick; it emitted a smell of sulphur. Eleven kilogrammes of the compound were introduced into three small wooden barrels, which were then carried with their bung-holes left open into a small house built of stones and roofed with tiles, the door locked and a train fired. A thick smoke first issued from the chimney, and was followed by flames; no real explosion took place, but after a few seconds the roof was thrown down, together with a part of one of the walls, although the three barrels, though somewhat injured, were found entire; so that the above-mentioned effect must be attributed merely to the pressure occasioned by the heat and the gas. In another series of experiments, a cartridge containing 38 decigms. of gunpowder was introduced into a Prussian needle gun. At 150 meters, the olive-shaped bullet went through a target composed of a piece of oak between two pieces of fir, forming an aggregate thickness of about a foot.—*Galignani.*

The Pneumatic Railway.

One of the four great tubes of the Waterloo and Whitehall Railway is now completed at Messrs. Samuda's yard, Poplar. It is 230 feet long, 12 feet 9 inches in diameter within, and is formed of ¼-inch boiler plate, surrounded by four rings of brick-work, which is thoroughly bound by cement, and flanged rings riveted to the plates. Its weight, as it lies, is nearly 1,000 tuns. Bulkheads are to be fitted at each end, and its flotation being then about 300 tuns, it will be floated up the river a distance of nearly five miles, to its intended destination, above Hungerford Bridge. Here an inner ring of brick-work will be built inside it, and just enough water will be then admitted to sink it upon its piers. Its ends will then be secured in a junction chamber, of which one will be formed at each of the three brick-work piers and at the abutments. In these water-tight joints will be made, and the bulkheads at the ends of the tubes will then be removed. The four tubes will thus form a great sub-aqueous bridge of four spans of 221 feet each, the tubes resting in a channel dredged across the bottom of the river, but being chiefly supported upon massive piers which do not rise even to the river bottom. The coffer dam at the Whitehall end of the line is no less than fifty-three feet deep, probably the deepest ever made.—*Charles Ryland & Sons' Weekly Report on the Iron Trade.*

Postal Money Orders, and Bankers' Drafts.

A clerk of one of the business houses of this city was sent out recently to inquire the price of a draft of $4,800 on California. He ascertained that it would be three per cent, or $144. His principal directed him to go to a well-known banker, to see if better rates could not be obtained. The clerk, mistaking the name given him, called on Postmaster Kelley, and was informed that his money could be sent by post-office orders for $24. This was an unexpected condition of affairs; money orders had not been thought of, but after due consideration the sum it was proposed to send to California was forwarded by these orders. The rate was just one-half of one per cent.

This money-order system is becoming very popular, as it deserves. It is the best and safest way to remit money.

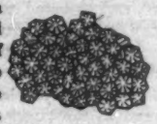
HON. JOHN FORSYTH, writing from New York to the Mobile *Register*, says of a portion of southern Pennsylvania, over which he has recently traveled:—"You ride over a country dotted with farms, groaning under crops, and are suprised at the lack of laborers, and wonder who does all this work. Capital and science have supplied the places of our large gangs of negroes, and the work goes on as if by magic. Thus Pennsylvania, with her three millions of population, enjoys productions equal to the labor of six millions. The same processes would make the South a garden of fruitfulness, the abode of a great population, and the seat of power.

A CORN-STARCH factory at Ottawa, Ill., consumes about one thousand bushels of corn per day.

THE MADSTONE—A DELUSION.

Our article the other day, in relation to the madstone, has attracted the attention of Prof. David Christy, formerly of Cincinnati, but now of this city. In a note to us he says:—

"When in Southern Illinois, a few years since, I had my attention called to the subject of the 'madstone,' in consequence of a few cases of persons having been bitten in the neighborhood where I was stopping, by a dog supposed to have hydrophobia. Three madstones were said to be in that section of the country, at distances of twelve, twenty-four and eight miles, respectively. Being at leisure, I resolved to gratify my curiosity by an examination of these marvels. The first I found to be a cross section of a specimen of coral, of the structure presented in the annexed cut. It was about a half inch in thickness, and one inch and a half square. The second one was of the same species of coral, but of greater length. The third was a common pebble of the size of a small apple, and about the same shape—the depression at the stem of the apple being represented by a corresponding one in the pebble, with the addition of a drilled hole, a fourth of an inch in depth, from which, it might be inferred, the stem had been pulled out. I had the good fortune also to obtain, when in Tennessee, a fine specimen of the 'bezoar' stone, taken from the stomach of a deer, killed in the Chilhowee mountain. It seemed to have formed in concentric layers. The outer layer had been broken by the hunter, and was somewhat rough on the outside, but the surface of the next one was as smooth as polished marble, as though worn by attrition against the inner surface of the outer shell from which it was detached—the surfaces of both being equally smooth. When divested of the outer layer, it was about the size and form of a common hen's egg. Its color was a light brown. It had not been used as a madstone, but was imagined to possess great virtues, not yet discovered. I presented it to Prof. Wood, of the Ohio Medical College, Cincinnati. I shall offer no comments on the coral and pebble specimens examined. The virtues attributed to them, of course, were imaginary. I may mention here, that I have witnessed the movements of a black snake in the supposed act of 'charming' birds, and that the facts, carefully observed, take all the poetry out of that popular delusion. At some future time I will endeavor to furnish an article on this subject for your columns."



Popular Photographs.

An English writer, in speaking of the sale of popular photographs, says:—

"A popular singer or actor or a successful prize fighter will sometimes have a run entering into tens of thousands of copies; but the demand will suddenly collapse and their names will be heard no more. Public men, whose names are distinguished in connection with the pulpit, with literature, science or art, or in the legislature, are in constant demand, notwithstanding that the especial rage of this collection of portraits has within the last twelve months considerably subsided. Royal portraiture is always popular, and perhaps nothing can more strikingly illustrate the loyalty of Englishmen than the constant demand for portraits of members of the reigning family. Just about the period of the marriage of the Prince of Wales, a photographer in Brussels had the good fortune to obtain sittings from the Queen and several members of the royal family, including the Prince of Wales and the Princess Alexandra, and the sale of these portraits exceeded two millions of copies. One photographer alone in this country has, during the last few years, issued upward of half a million yearly of members of the royal family. After the royal family, the popular statesmen are the greatest favorites; Lord Palmerston, during his life and for some little time after his death, being in greatest demand. If the sale of men's portraits afford any indication of the popularity of their principles, it is tolerably manifest that liberalism obtains very strongly in this country, the circulation of the portraits being in the ratio of ten of Gladstone to one of Derby, who is, however, judged by this standard, the most popular of the conservatives. On the other hand, the portraits of Louis Napoleon and Garibaldi have about an equal popularity, the rage for the portraits of the latter being more spasmodic, and of the former more steady. After statesmen, popular literary men and clergymen are most in demand; and after these, men of science and artists; and lastly, popular actors and singers. Bishops seem to circulate by virtue of their rank, the Archbishop of Canterbury having the most extended circulation, while clergymen and ministers are prized only in virtue of their popularity. Mr. Spurgeon was for a time in very large circulation Mr. Binney less extensively, but more constantly."

MISCELLANEOUS SUMMARY.

MR. GEORGE PEABODY has given one hundred and fifty thousand dollars to found and maintain a museum and Professorship of American Archæology and Ethnology, in connection with Harvard University. A like sum has also been donated to Yale College for the foundation of a museum of natural history, especially of the department of zoology, geology and mineralogy. Of this sum a part, not exceeding one hundred thousand dollars, is to be devoted to the erection of a fire-proof building, planned with especial reference to its subsequent enlargement, when the bequest of a building fund of twenty thousand dollars shall have accumulated to one hundred thousand dollars. The remaining portion of this donation is to be invested, and the income from it to be expended, for the care of the museum, increase of its collections and general interests of the departments of science already named; the part of the income remaining, after providing for the general care of the museum, to be apportioned as follows: three-sevenths to zoölogy, three-sevenths to geology, and one-seventh to mineralogy.

OLD COLLODION.—*Humphrey's Journal* says that old collodion may be rejuvenated and made useful in the following manner: "Add alcohol and ether in equal parts, or a mixture of one-third alcohol and two-thirds ether is still better—until the collodion flows easily and is thin enough to coat the plate without streaks; furthermore, to each quart of collodion add sixty grains of bromide of cadmium, and put the mixture, after frequent shaking, in a cool, dark place. This collodion probably will become colorless and work as well perhaps as the best new collodion that can be made."

THE Michigan Southern and Chicago and Rock Island Companies, jointly, are erecting an immense depot, probably the largest in the country. The length of the building is six hundred and ten feet, width one hundred and sixty feet, and the hight from the track to the highest portion of the roof is about seventy feet. The total cost will be about $300,000.

THE turpentine product of Butte county, California, where three companies are now engaged in the distillation of that substance, amounts to about four thousand gallons per month. Another product of the coniferous forests of this country, is an oil distilled from the hackmatack, colorless and light as camphene, and valuable as a detergent, cleaning grease spots from the most delicate fabrics without leaving a stain.

A FRENCH *savant* has lately discovered that certain fish contain eggs enveloped in veritable silk cocoons. Each egg measures 35 centimeters long by 13 broad, and weighs 240 grammes, and is covered with silky filaments, which may be employed in weaving.

IT appears from recent experiments conducted by the London Pneumatic Co., that one hundred and twenty tuns of goods can be sent through their eighteen miles of tubes every hour at a cost less than 1*d.* a tun per mile.

THE total amount of tobacco produced throughout the world is estimated as follows:—Asia, 309,900,000 pounds; Europe, 281,844,500; America, 243,280,500; Africa, 24,300,000; Australia, 714,000; making in all 995,039,000 pounds.

THE wool clip of Buenos Ayres the present year is estimated at 160,000 pounds, and will be worth twelve millions of silver dollars.

M. H. MICOLON, of Paris, proposes a new alloy for the manufacture of all metal articles—bells, hammers, anvils, rails, and non-cutting tools. The alloy consists of 20 parts of iron turnings or tin waste, 80 parts of steel, 4 parts of manganese, and 4 parts of borax; but these proportions may be varied. When it is desired to increase the tenacity of the alloy, two or three parts of wolfram are added. When the cupola is ready, the iron and steel are poured in, the manganese and borax, and the vessel is filled up with coke.

A COMPANY has been organized, with a capital of $400,000, to develop the valuable water-power of the Housatonic River, by constructing a dam 20 feet high, and 600 feet long, near the northern line of Birmingham. A canal is also contemplated on the Birmingham side, 50 feet wide, to that village, and another on the west side of the river, 100 feet wide and 7 feet deep, extending from the dam to a point opposite the mouth of the Naugatuck. This one is to be furnished with locks, thus enabling vessels to go up the canal and land or receive freight from the factories on its banks. The company expect to receive a rental of $80,000 a year, or twenty per cent on the capital invested.

KRUPP'S great steel works at Essen, Prussia, cover 400 acres of ground, consume 750 tuns of coal daily, use the steam of 120 boilers, burn 7,000 flames of gas, and give employment to above 8,000 men and boys, whose wages amount to nearly £400,000 a year. The establishment last year turned out upward of 50,000 tuns of cast steel, one-third of which was made into guns, the rest into bars, shafts for engines, axles, railway bars, tires of wheels, plates for boilers and ships.

THE electrical power of the Atlantic cable is now furnished by a twenty-cell Daniell's battery. The two cables have been joined, making a line of 3,700 miles, and signals have been passed through this entire distance in a little more than a second of time. The only power used was that given by a battery consisting of a lady's silver thimble filled with acid, into which were placed a bit of zinc and a bit of copper.

THE privilege of printing the catalogue of the Paris Exhibition was sold to a Parisian publisher for the sum of one hundred thousand dollars.

LEAD PIPE FATAL TO FISH.—Mr. L. M. Crane, of Ballston, N. Y., who breeds a good many fishes, states that it will not do to use lead pipe to conduct the water into the fish ponds. The fish soon die when lead is employed.

GREAT quantities of pencils are now made in England of a composition formed of sawdust and small pieces of lead, which are ground to an impalpable powder, mixed with some cohesive medium. In Keswick, 250,000 pencils are made in a week, or 13,000,000 a year, and 12,000 cubic feet of cedar are annually consumed.

EIGHT million bushels of corn have been exported from New York the present year; twenty-six million pounds of beef, seventeen millions of butter, sixteen millions of lard, nine millions of tallow and three millions of tobacco.

ROLLING MILL WANTED.—We are requested to call the attention of our readers to the advertisement, in another column, of the Calvert Iron Co., for machinery for a rolling mill.

DR. A. HILL, of Norwalk, Conn., has invented a simple process by which oil paintings can be executed on marble, with the colors as permanently fixed as in stained glass.

NEARLY twenty thousand boxes of eggs, of one hundred dozen each, arrived in Boston, from Maine, during the year, beside the large quantities received from Canada.

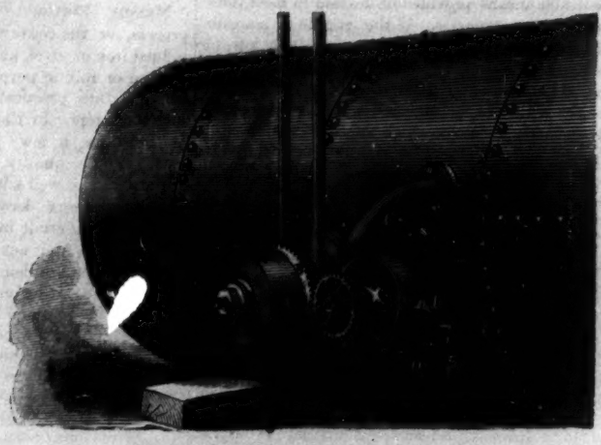
IT is reported that a company at Lyman, N. H., is getting out quartz which yields a larger per centage of gold than the California or Colorado mines. Specimens have been assayed yielding $864 40 to the tun.

A PETRIFIED human hand was lately found in red sandstone at Memphis, Tenn., in a perfect state of preservation.

MONTHLY steam communication has been established between San Francisco and New Zealand.

Patent Boiler Feeder.

Force pumps for feeding boilers are not always reliable, and even when the adaptation of the principle and the workmanship of the pump can be depended upon, constant oversight and care is required. For these reasons an automatic feeder for steam boilers has been considered a great desideratum. There are some devices which have been used and are now employed for this purpose, which by many are considered improvements on the ordinary force pump. The engraving illustrates, in perspective, one of these plans which has received strong commendation.



WIDGEON'S BOILER FEEDER.

It is an automatic boiler feeder which is operated by the live steam of the boiler. The chamber, A, revolves on a spindle, and is furnished with a toothed disk, B. The chamber is kept in position by means of a nut and a steel washer which is hollow, or concave, and acts as a spring. The face of this chamber abuts on a plate to which the pipes, C and D, communicating respectively with the steam and water space of the boiler, are connected, and also with the pipes, E and F, communicating severally with the external atmosphere and with a water tank. The chamber, A, is furnished with two apertures, opposite each other, which, by its revolution, are brought intermittently in contact with apertures in the pipes, C, D, E, and F.

The revolutions of the chamber, A, are produced by means of the pulley, G, and pinion, H. The pinion has a portion of its teeth on opposite sides cut away to allow the action of the chamber in taking the water to be forced into the boiler, and in expelling the steam contained in the chamber.

One of the apertures being opposite that of the pipe leading from the water pipe, the other corresponds with the open air pipe, allowing the steam in the chamber to be expelled and the water to fill the chamber. A partial revolution closes these ports and opens those from the pipes, C and D, by which the steam from C forces the water through D into the water space of the boiler. This process is repeated indefinitely.

Patented March 13, 1866, by J. R. Widgeon. For additional particulars address Frederick E. Frey, Bucyrus, Ohio.

Vulnerability of Iron-clads.

In our issue of Oct. 20 we briefly commented on the experiments at Shoeburyness, with the Woolwich nine-inch gun and the Palliser chilled shot, expressing the opinion that the London *Times* was not correct in deducing, from the penetration of the eight inches of iron plating with its eighteen inches of teak backing, the conclusion that the supremacy of iron-clads was ended. We stated that it was doubtful if the Shoeburyness target was equal in resisting power to our monitor turrets of twelve inches of iron, which could be increased to twenty-four inches.

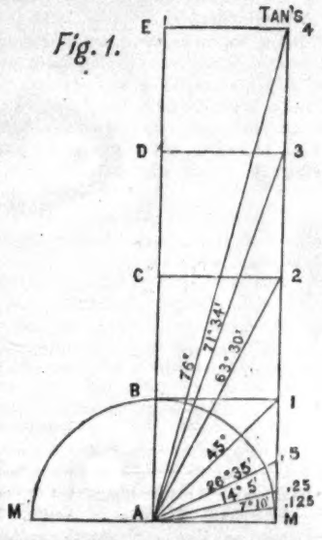
Mr. John Bourne, in a letter to the *Engineering*, substantially agrees with these remarks. He says: "If the 9-inch gun, with 45 lbs. of powder, can pierce an 8-inch plate with 18 inches of teak backing, when furnished with the Palliser projectile, what effects may we not expect from the 13½-inch, 15-inch, and 20-inch guns when firing similar projectiles with from 70 to 120 lbs. of powder? In my opinion, the side armor of modern iron-clads should not be much less than 18 inches thick, backed by three or four feet of oak, and by the monitor system of construction this thickness is attainable on a displacement similar to that of the *Bellerophon*. The turret should be 24 inches thick, and should carry two 20-inch wrought-iron guns. Such an iron-clad, it might fairly be expected, would remain secure from penetration for some years. But 8-inch or 10-inch armor cannot be expected to keep out the shot fired even from existing guns, to say nothing of the more powerful guns which the next few years will be sure to bring forth. Why should we leave anything in doubt in so vital an affair? Why should we, with our knowledge of the growing power of ordnance, so adjust our means of resistance as to be hardly able to withstand even its present force? With our present knowledge of what guns, even of moderate size and with moderate charges, can do, it would be quite inexcusable to allow ourselves to be again taken by surprise in this matter; and I maintain that any thickness of armor, much less than what I have specified, would be futile, and should not be contemplated at this time of day."

THE ANTHISTOMETER OR MEASURER OF RESISTANCE.

At a late meeting of the Polytechnic Association Dr. L. Bradley presented the following article in introducing his combined tangent galvanometer and rheostat, an instrument designed for conveniently and accurately measuring the resistance which conductors of electricity oppose to the free transmission of currents.

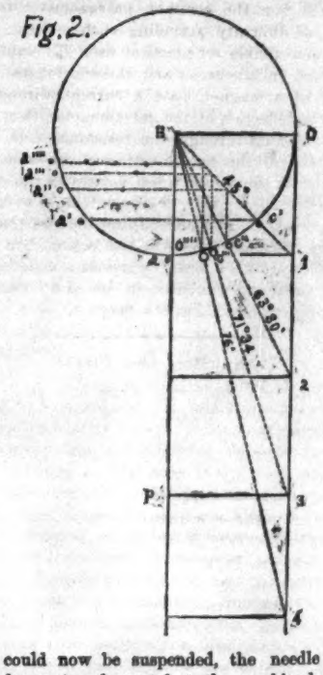
The subject of a uniform standard of resistance has long engaged the attention of electricians, but without arriving at satisfactory results.

Fig. 1.



Wire of a given number, though often made use of, is open to objection, for it is apt to vary in dimensions and resistance. The standard unit of this instrument approximates one mile of No. 8 iron wire. In construction it consists of coils differing in resistance from one-quarter of a mile to 150; which, by means of switches, may be increased to 1,200, and the graduated sliding bar subdivides the one-quarter of a mile into hundredths. The true tangent galvanometer should measure the strength of a current in circulation, as directly proportional to the tangent of the angle of deflection. Common galvanometers do not fulfill the requisite conditions for this, for the adventitious force which is sent through the galvanometer coil never acts with the same uniformity upon the needle in all its deviations as the terrestrial magnetism does, for when the coil is narrow and the needle long, the inductive influence upon the needle is greatest when at or near the meridian; but, as it deflects, its extremities pass away from the rays of induction, and its deflections grow less and less, so that the rule is no longer in force. To obviate this difficulty, he first made a coil of four layers whose width equaled the length of the needle; but now the difficulty was in the opposite direction. Upon reflection, the expedient presented itself of making a compound needle composed of several thin flat needles fixed upon a light flat metallic ring, so as to form a complete circular disk having indexes to show the degree of deflection. The compound needle polarized and mounted was found to move with great celerity, and being under the influence of the same number of convolutions in all its deflections, will fulfill the conditions required in demonstrating the theorem that the intensity of currents is proportional to the tangent of the angles. The following is the verification: Let A M, in the annexed diagram, geometrically represent the force of the terrestrial magnetism which is made the unit of directive force. If an electric current be sent through the galvanometer coil, whose directive force, A B, equals the terrestrial force, the tendency would be to direct the needle in a perpendicular line. If this

Fig. 2.



force could now be suspended, the needle would point due east and west, but the combined action will direct it to the point, 1; this cuts the quadrant at 45 deg., the line M1 being the tangent of 45 deg., which is 1. Increase the intensity to twice this force, and represent this by the line A C, then the force A M and A C will direct the needle to the point; 2, applying the quadrant, we find this line cutting the circle at 63 deg. 30 min., of which the tangent is 2. We may increase the parallelogram erected on A M at pleasure, and the combined forces will always cause the needle to point diagonally to the opposite angle, whose hight is the tangent of the angle of deflection. It is generally admitted that the correlation of forces in magnetism is the same as that of gravity, each within its sphere, the former finite, the latter co-extensive with the universe. Let us suppose that to a graduated wheel (Fig. 2) we attach a pound weight at *a*, it will take a position in the plumb line. We may consider this pound weight to be a constant unit of force corresponding to that of terrestrial magnetism in Fig. 1. If we attach at C, a force equal to *a*, the two are then related the same as A M and A B, in Fig. 1, and will stand equally distant from the line of centers of gravity at *a'* and *c'*, the wheel having turned just 45 deg. By doubling the force, it will descend to *c''* and the weight *a'* will ascend to *a''*, that is

just twice the distance from the line of centers as *c*, is found, and the plumb line, it is seen, cuts the wheel at 66 deg. 30 min., whose tangent is 2. It is unnecessary to multiply examples, to show that whatever be the force, the distance of the weights from the line of centers will be inversely proportional to the weight, and the plumb line will cut the wheel at the degree whose tangent is directly proportional to the weight, therefore the intensity measured, by the true tangent galvanometer, is proportional to the tangents of the angles of deflection of the needle. To prove the accuracy of my galvanometer, I will give the results of five observations. This instrument has three coils, the first for intensity consists of three layers of No. 32 copper wire, giving 3·1 mile resistance; the second, for common mixed currents, has one layer of No. 28 wire, resistance of .4 mile, the remaining coil for quantity alone, is a simple plate of copper whose resistance is entirely null. The power employed was four cups of Hill's battery, passed through the first coil, then through coil No. 2, against resistances differing from 4·1 to 151·1. Isodynamous, or equally intense currents, being obtained, the resistances introduced were 4·1 11·1 41·1 81·1 and 151·1 mile. The tangents of the deflection of No. 1, from 75 deg. to 8 deg. 30 min., divided by those of No. 2 from 40 deg. 10 min. to 2 deg., gave the quotients 4·4 4·3 4·4 4·44 and 4·3. Such results give indications of a very true tangent galvanometer, equaling in accuracy the large, cumbersome and inconvenient instruments that have formerly been used. By intricate computation and by means of tables, results sufficiently reliable for ordinary purposes may be obtained from the common galvanometer, but the labor and difficulty attending such methods render them unavailable for practical use. To employ this improved galvanometer and rheostat for testing the power of a magnet, pass a current through, and note the deflection of the galvanometer, then switch off the current through the resistance coils of the rheostat until the needle settles at the same degree as when on the magnet, the figures on the rheostat corresponding to this degree will show at a glance the resistance. For determining the resistance of a battery cup, pass the current as before, then reverse the poles, thus the mean or average deflection can be obtained and compared in the same manner as when determining that of a magnet.

Squaring the Circle.

From L. D. G. we have an article, in which he claims the solution of the long-mooted problem of "squaring the circle." Upon a critical investigation of his process we think he has misunderstood the problem itself. It is essentially a geometrical, and not a mathematical problem. We regard the squaring of the circle as a question belonging to a similar class with the *ignis fatuus* of the perpetual motion, and like that, incapable of practical demonstration. The efforts of our correspondent seem to have been directed to forming a square of the same area of a given circle. His operation is simple, being merely the finding of the area of a circle from its diameter, and the elimination and defining of the lines of a square containing the same amount of surface. His rule for it is this: "To find the circumference of a circle take eleven-fourteenths of the diameter and multiply by four; or in other words, take forty-four fourteenths of the diameter, which gives the circumference." For large circles this is approximately correct and is easily worked. For small circles of a few inches the fractions will hamper and annoy. The area he finds by "multiplying eleven-fourteenths of the diameter by the diameter. Seven-elevenths of the area of the circle is the area of the square contained in the circle. The square root of the area of the circle will give the sides of a square equal in area to the circle."

There are no sums representing equally any portion of a circle and the sides of a square, so the attempt to make the two coincide must be forever futile. The decimals for finding the circumference of a circle usually employed are 3·1416+. These may be carried to 3·14159265+, and so on indefinitely, even so far as to two hundred places of decimals, as in the *Engineer* of Sept. 28th. It is manifest that the process may be continued forever, and as no coincidents can ever be found between the elements of a circle and those of a square, the idea of squaring the circle by a geometrical solution is vain.

Correspondence

Salvation of Ships in a Gale.

MESSRS. EDITORS:—The occasional occurrence of one of those terrible disasters at sea, the loss of a passenger steamship by losing control of the ship, leads to the inquiry whether there cannot be some practicable means provided or devised to meet these particular emergencies. If the engine of a steamship breaks down during a hurricane, she is lost, no matter how strong she may be or how well appointed; she becomes a helpless mass, lying in the troughs of the sea and presenting her whole broadside squarely to blows which are capable of tossing five and ten-ton blocks of granite about like cord wood; and it is only a matter of a few hours' time for the best of ships to be battered and beaten to pieces.

The loss of the *Evening Star* is owing directly to her becoming unmanageable—her rudder chains became jammed, and being uncontrolable, she was, as a matter of course, soon battered to pieces. The *Great Eastern* broke her rudder a few years since, and was nearly lost, and had she been caught in a regular hurricane she would have been ignominiously beaten to pieces like any other ship. The ship was never yet made that could survive, for any length of time, under such conditions. It was so with the fine new steamship *San Francisco*, which sailed from New York in 1853, bound around Cape Horn for California, with a regiment of United States troops on board; she was overtaken in the Gulf Stream by a heavy gale, and being crippled became unmanageable and at the mercy of the elements, and was soon so battered that the force on board, by bailing and throwing out cargo, could barely keep her afloat for a day or two until ships at hand could get an opportunity to take them off the wreck. While lying in this crippled state, by one single blow of those terrible seas, one hundred and seventy-nine souls, officers and soldiers, were washed overboard and lost. I believe there is a remedy for such cases. If a ship can be kept head to sea, or nearly, so that a sea must strike her sides at an angle, then the whole aspect becomes changed, and a bad sea becomes comparatively harmless; besides, the motion of a ship becomes much less violent, which not only lessens the strains upon her hull but gives the crew a better opportunity to do something toward repairing or preventing damages. Sailing ships are less liable to become entirely unmanageable than steamers, as, if they ship a sea, no fires are put out, and if one mast or sail gives out they have others left; if the rudder becomes broken or disabled the ship can be managed to a considerable extent by the sails, independent of the rudder, while, if a steamer loses the use of her rudder, what sails she has usually are of little consequence with heavy wheels dragging in the water.

Every passenger steamship should be obliged to carry a heavy iron drag for "lying to" by in such emergencies; this drag should be made in such form that it could be used ordinarily as a water tank, so as not to be useless lumber in the way. It should be braced and made sufficiently strong to stand an external pressure of about 100 lbs. to the square inch, and have a heavy ring bolt in each end; and when such an emergency should arise as to require it as a drag, then the tank should be emptied and closed water tight and shackled to one of the anchors by a chain say 50 feet in length. The tank having been bundled overboard, the anchor is then let go in the ordinary way. After one or two "shots" of chain cable have been paid out, a second tank or drag can be shackled to the cable as before. With several of these drags distributed at intervals, a very elastic mooring would be obtained, owing to the nature of its construction. With two chain cables shackled together and out ahead, with such drags attached, the *San Francisco* and *Evening Star* would have made good weather of it instead of being battered to a mass of kindling wood. Keep a ship head to sea and she will "live forever." These drags are no new experiment, but have at one time and another saved many a vessel. Spars, or something of the sort, are usually lashed to an anchor and let go.

The complaints of the papers about the life boats of the *Evening Star* rolling over and over after being launched, and of the ship being lost when the life boats would float, are all nonsense. These disasters will always occur as often as a steamship breaks down at sea in very heavy weather, and becomes unmanageable. M.

New York, October, 1866.

Iron and Steel.

MESSRS. EDITORS:—The pneumatic or air-blast process, for the conversion of crude molten iron into refined iron or steel, and refined steel ingots, fit for forging or rolling purposes, is now beginning to be brought into practical use by our iron and steel manufacturers. In England the same process has been in use a few years longer than in this country. The quality of our American pig iron is admitted to be well adapted to the use of the air-blast process as a decarbonizing and refining agent for converting crude iron into ingots fit for the forge or the rolls. And our American pig is of superior quality to the English metal made with coke. This mode of converting crude iron with air-blast was patented in England by Henry Bessemer in 1856, and for the past few years has gone into general use in that country for the manufacture of refined steel, T-rail, locomotive tire, car axles, boiler plate, etc. The invention was patented in the United States by Christian Shunk, and for which he holds three several Letters Patents, commencing August 26, 1854, and has, therefore, prior title to any in Europe or in the United States; and having discovered and experimented in the use of said process many years previous to that date.

The alleged discovery of Robert Mushet, of England, claiming the use of "manganese and carbon" in the manufacture of steel, is old, the same having been patented in England many years before [see 2d Curtis page 380], and has always been used by steel manufacturers in England and in this country. Nor is it new to add carbon to iron at a high heat to produce steel, which Mushet describes in his alleged patent. That iron, at a high heat, will combine with carbon, and thereby produce steel, has always been known and practiced by steel manufacturers, and is as old as iron and steel itself. And the same mode has always been practiced in the manufacture of steel, by the "black-lead crucible" process for making steel, by adding carbon to combine with the fluid iron in the crucible to produce steel for molding into ingots for forging.

In my pneumatic process, by continuing the air blast a few seconds longer to reduce the carbon, more carbon, or crude metal containing carbon, can be added to increase the carbon again to the kind of yield desired, which goes to show the utility and simplicity of the patented invention; and the same is protected in every mode, and so decided by our courts in similar cases. [2d Curtis. Nisely *vs.* Harford. See also Forsyth's patent, same book, page 109]. It would be just as novel for Robert Mushet to patent the common mode for welding a particular kind of iron or steel by the use of borax—and that would be no novelty at all—as his alleged discovery, as to add carbon to iron at a high heat in the air-blast crucible, to produce steel, a thing known by all steel manufacturers since the first invention of steel. Mushet's alleged discovery failed in England for want of novelty, the thing being known long before. And he failed to introduce it into public use in the United States within eighteen months from its date, as required by our patent laws in relation to aliens; but his alleged discovery was void from the first for want of novelty.

The machinery for rolling steel locomotive tire, etc., patented by Henry Bessemer, of England in 1859, and subsequently patented in the United States, July 1865, was an abandonment in this country by the lapse of time, and the same became public property in the United States.

CHRISTIAN SHUNK.

Greenville, Pa.

DIRT is destructive, as well as disgusting.

Sympathetic Inks.

Messrs. Editors:—Accidentally my attention was drawn to some information given by you to correspondents about sympathetic inks. As this subject may be interesting to many of your readers, and the knowledge it conveys may sometimes usefully be applied as a chemical test, I give here some additional information.

Sympathetic inks are of four kinds: 1. When the writing becomes visible by simply applying heat or atmospheric moisture or dryness. 2. When peculiar gases or vapors make it visible. 3. When solutions of chemical or other compounds accomplish the same thing. 4. When the simple action of light will make the writing or drawing visible (Photographic preparations).

FIRST CLASS.—No. 1. *Red Sympathetic Ink.*—Nitrate of the deutoxide of copper. A weak solution gives an invisible writing, which becomes red by heating.

No. 2. *Yellow Sympathetic Ink.*—Chloride of copper. A very dilute solution is used, invisible till heated. To make it, dissolve equal parts of blue vitriol and sal ammoniac in water.

No. 3. *Yellow and Green Ink.*—Nitrate of nickel and chloride of nickel. A weak solution forms an invisible ink which becomes green by heating when the salt contains traces of cobalt, which usually is the case; when pure it becomes yellow.

No. 4. *Green and Red Ink.*—Chloride of cobalt. A properly-diluted solution will produce a pink writing, which will disappear when thoroughly dry, become green when heated, disappear when cold, and pink again when damp. When often or strongly heated it will at last become brown red.

No. 5. *Blue Ink.*—Acetate of the protoxide of cobalt. When the solution of this salt contains nickel or iron, the writing made by it will become green when heated; when it is pure and free of these metals it becomes blue.

No. 6. *Light Brown Ink.*—Bromide of copper. Perfectly invisible writing, which appears very promptly by a slight heating, and disappears perfectly by cooling. To prepare it, take one part bromide of potassium, one part blue vitriol, eight parts of water. It is better also to discolor the blue vitriol with one part of alcohol.

Amusing Application.—A winter scene may be so executed that the green leaves of the trees and the grass on the foreground are painted with ink made from cobalt and nickel solution, No. 5; the red berries and flowers with No. 1, yellow flowers and fruits with No. 2, and the blue flowers with pure cobalt, No. 5. When such a picture is slowly and carefully heated, the invisible parts of the plants become visible, and it is as if the heat changed the winter into a summer scene. There are several other substances which may be used for invisible writing, which becomes so by heating—lemon and onion juice, milk, diluted sulphuric acid, etc., etc.

SECOND CLASS.—No. 1. *Dark Brown Ink.*—Acetate of lead. A drawing or writing with a strong solution of this salt becomes dark brown by exposure to sulphide of hydrogen gas. I developed once before my class in the Cooper Union, the life-size profile likeness of Mr Peter Cooper, on a large sheet of paper under a glass bell jar; as Mr. Cooper himself was present, and accidentally had taken seat in front of that bell jar, it excited the utmost astonishment among the occasional visitors, who were not posted up about the action of sulphur vapors on lead, till I explained that the likeness had beforehand been drawn by me on the paper with a lead solution, and that sulphide of hydrogen vapors were being developed in the bell jar.

No. 2. *Dark Blue Ink.*—Iodide of potassium and starch. Writing with this becomes blue by the least touch of acid vapors in the atmosphere, or by the presence of ozone. It is in fact the celebrated ozone test. To make it, boil starch and add a small quantity of iodide of potassium in solution.

No. 3. *Light Blue Ink.*—Sulphate of copper. A very diluted solution will produce an invisible writing, which will turn light blue by vapors of ammonia.

No. 4. *Red Ink.*—Soluble compounds of antimony will become red by sulphide of hydrogen vapor.

No. 5. *Yellow Ink.*—Soluble compounds of arsenic and of peroxide of tin will become yellow by the same vapor.

No. 6. *Flesh-colored Ink.*—Soluble compounds of manganese become flesh-colored by the same vapor.

No. 7. *Blood-red Ink.*—An acid solution of chloride of iron is diluted till the writing is invisible when dry. This writing has the remarkable property of becoming red by sulpho-cyanide vapors, and it disappears by ammonia, and may alternately be made to appear and disappear by those two vapors. To make this experiment more striking, take two wide-mouthed jars, one with some liquid ammonia on the bottom, the other with some strong sulphuric acid and sulpho-cyanide of potassium. The last salt is added from time to time in a small quantity.

Amusing Application.—As lead, antimony, arsenic, and manganese, Nos. 1, 4, 5, and 6 above, all become respectively brown, red, yellow, and pink, by sulphide of hydrogen vapors, a drawing may be made with solutions of the salts of those metals, which will show the different colors when exposed to those vapors. However, they do not disappear again, like the sympathetic inks of the first class.

To make the sulphide of hydrogen gas, pour some diluted sulphuric acid on powdered black sulphide of iron.

These are only a few of the great number of sympathetic inks of those two classes which may be made; many new ones may be found by an experienced practical chemist. The number of those belonging to the third class is still larger; to enumerate them all would take more room than this paper can afford, and I will close with only mentioning one of them.

THIRD CLASS.—*Many-colored Inks.*—A very diluted solution of chloride or sulphate of iron used for writing will turn black when washed over with a decoction of gallnuts or logwood, will turn blue by a solution of the yellow prussiate of potash, red by sulpho-cyanide of potassium, etc., or one may write with one of the last solutions, and to make it visible wash it by means of a soft brush with an iron solution.

FOURTH CLASS.—This class belongs to the photographic department. One of the simplest preparations is a diluted solution of nitrate of silver used on paper which has been washed previously with sea-water or some other diluted salt solution. This writing will become black by exposure to light.

There are also numberless other preparations of this class, but for the present the above will be sufficient.

P. H. VANDER WEYDE, M. D.

Philadelphia, October, 1866.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

CARRIAGE-TOP PROTECTOR.—E. NICKSON, Akron, Ohio.—The object of this invention is to prevent and obviate the wearing away of the tops of carriages, when let down.

MACHINE FOR SCALDING HOGS.—MATHIAS STRICKER, Vincennes, Ind.—The object of this invention is to supply a cheap and convenient device for scalding hogs when butchered, enabling farmers to perform this operation much more expeditiously and perfectly than by the ordinary methods.

COTTON TIE.—J. H. GRIDLEY, Washington, D. C.—The object of this invention is to provide a simple, cheap, and reliable fastening for the ends of metal ties or packing bands, particularly those used upon bales of cotton, and it consists in having one or both ends of the band cut or otherwise made in dovetail form, to fit correspondingly shaped flanges made either on the band itself or on a separate piece.

GATE.—HENRY ADAMS, Seattle, Washington Territory.—This invention consists in so hanging a gate that it can be adjusted in hight, so as to swing clear of all obstructions upon the ground.

PLOW.—JAMES HARRIS, Kansas, Ill.—This invention relates to a new and improved double or gang plow, and consists in a peculiar construction of the same, whereby a very strong and durable plow of the kind specified is obtained, and which will admit of a shoval plow being substituted for a breaking or mold-board plow, so that the device may be used as a cultivator when required.

GRAIN KILN.—NICHOLAS WALLASTER, Detroit, Mich.—This invention has for its object to furnish a kiln for drying grain conveniently, thoroughly, and in any desired quantity.

MITER BOX.—J. A. MCKINSTRY, Monson, Mass.—This invention relates to a new and improved miter box of that class in which the tangents are adjustable to admit of the moldings or other articles or stuff to be operated upon being cut or sawed to any desired angle. The object of the invention is to obtain a miter box of the class specified which will be simple in construction, capable of having its saw guides adjusted with facility and great accuracy, and also capable of having the guides removed without any difficulty when worn by use.

CULTIVATOR.—J. B. HERMAN, Mount Vernon, Iowa.—This invention relates to a new and improved cultivator of that class in which the plows have a vertical and also a lateral adjusting movement. The invention consists in a novel construction and arrangement of the plows, whereby the plows are retained in the ground or prevented from rising or being thrown out, and a free lateral movement allowed the two inner plows.

BRICK MACHINE.—J. B. GRIDLEY, Albany, N. Y.—In this machine the clay-compressing plunger is held down upon the clay long enough to prevent liability of expansion or rising of the clay when the plunger is raised out of contact with the same, and when the plunger is elevated, its actuating device fails to give it the downward motion until the mold or mud box has received the requisite charge of clay. The main wheel or actuator is provided with horizontally-projecting flanges, which, in connection with suitable springs, serve to operate the levers which feed the molds to the plunger. A track is provided for the followers, the wheels of which are so arranged as to prevent wabbling.

CULTIVATOR PLOW.—W. O. GIBSON, Charleston, S. C.—This invention relates to a new and improved cultivator plow designed for weeding and for loosening the soil around growing plants.

SPINDLE STEP.—A. P. KINNEY, South Carver, Mass.—The object of this invention is to obtain a step for spindles and upright shafting generally, which will retain the oil or lubricating fluid, prevent the same being thrown about or scattered, thereby preventing the step and the portion of the spindle or shaft which works therein from becoming dry and consequently from heating, and also preventing parts adjacent to the step from becoming soiled or greased by the oil.

THRIBBLE TREE.—J. B. MORRISON, Fort Madison, Iowa.—This invention relates to a new and improved thribble tree or three-horse splinter bar, and consists in a novel arrangement of parts whereby the draft of three horses attached thereto is equalized and the device rendered capable of being adjusted to suit horses of different sizes, or varying powers of draft.

CORN PLOW.—PETER BARNHART, Chillicothe, Ohio.—This invention consists in the peculiar shape of the beam for a corn plow and in the form of the standards to which the shares are attached and in a movable fender which prevents the ground from being thrown on to the crops, making one of the most economical implements used on the farm.

INTERMITTENT AND EXPANSIVE GEARING.—LYMAN B. POTTER Putnam, Conn.—This invention consists in the application of a device to spur gearing for the purpose of changing the speed of a wheel while the wheel gearing into it continues its motion without variation of velocity.

MANUAL POWER.—JOHN B. YAGER, Trenton, Ohio.—This invention is to supply a compact and powerful manual power by means of two double levers which operate together upon a double crank shaft in such manner as to counteract the dead center and convert a reciprocating into an uninterrupted rotary motion whereby the power applied to the levers is exerted constantly to the greatest advantage.

CORN SHELLER.—WILLIAM COLWELL, Chillicothe, Ill.—The nature of this invention consists in constructing a corn sheller provided with a toothed cone combined with a cleaning and elevating apparatus, so that the corn is shelled from the cob and fanned or winnowed and elevated to any suitable hight for putting into sacks or wagons.

RAFTING PIN.—THOMAS B. RAYMOND, Saginaw, Mich.—This invention consists of a wedge-shaped pin so formed as to hold a straight rope, thereby removing any necessity for "cleaning" the rope.

CORN PLANTER.—W. H. COX, Virden, Ill.—This invention relates to seed-planting machines, and consists in novel and improved mechanism for dropping single kernels of Indian corn in regular succession in drills, operated by gearing connected with the driving wheels as the machine moves in the field, and also an arrangement for shifting the gearing and arranging the dropping apparatus to work by hand and plant the corn in hills.

SASH FASTENING.—BENJ. S. HYERS, Pekin, Ill.—The nature of this invention consists in so constructing a small wheel the periphery of which is corrugated and is also provided with teeth upon the end at the periphery and placed in a small metal box in such a manner that it may be applied to a window sash so as to fasten the sash at any desired point.

CORN PLOW.—RICHARD C. HOWARD, Lisa, Ill.—The nature of this invention relates to an improvement in corn plows which consists in providing a rock shaft provided with levers to which cords are attached by which, through the medium of a lever, the driver is able to throw the plows out of the ground and the weight be brought upon the wheels so that it can be drawn from place to place without the plows coming in contact with the ground.

PISTON PACKING.—WM. G. SNOOK and O. C. PATCHELL, Corning, N. Y.—This invention has for its object to furnish an improved self-regulating piston packing which may be set out with any desired force when and where required by the action of the steam or water in the cylinder.

LOCK.—A. O. MILES, Nashua, N. H.—This invention relates to certain new and useful improvements in a lock previously patented. The present improvement consists in arranging the tumbler frames in such a manner that they may be moved under the action of the key in two different directions, up and down, for the purpose of varying the position of the tumblers relatively with each other, thereby obtaining a positive movement which is reliable and renders the lock far more durable and less liable to get out of repair than hitherto, and admits of the changes being effected through the medium of the key alone. The invention also consists in an improved means for retaining the bits of the key in the latter so that they cannot become detached and lost even when not secured in position to operate upon the lock.

TANNING HIDES AND SKINS.—GEORGE D. WHEELOCK, Freedom, Ohio.—This invention relates to a tanning process, which is based on the use of such chemicals, in combination with suitable quantities of catechu, sumac, or other astringent salts, that a tough, pliable, and heavy leather can be produced in a comparatively short time.

PRESSING BED BOTTOMS.—GARRY B. DAVIS and CHAS. B. DAVIS, Freeport, Ill.—The object of this invention is to so construct a spring bed bottom as to have a uniform springing capacity, as well as also to be simple in arrangement of parts, and thus not likely to get out of order.

COMBINED STOVE-LID LIFTER, PRICKER, PAN, POT, SAUCEPAN, ETC., LIFTER, AND HAMMER, AND TACK PULLER.—J. G. LOWE-SMITH, Mansfield, Ohio.—This invention consists in the combination in one implement of several articles in constant use about a kitchen, to wit, a lifter for stove covers, etc., and a tack-puller.

APPARATUS FOR DISCHARGING GRAIN FROM VESSELS.—C. H. MERRY, Danielsville, Ill.—This invention has for its object to facilitate the unloading of grain and other substances from vessels.

OIL CAN.—W. J. PRALL, Pomeroy, Ohio.—This invention is designed to furnish a neat, durable, and convenient can for holding and handling carbon and lard oils.

FUMIGATOR.—ISAAC HUTCHINS, Jr., Wellington, Me.—This invention is designed to furnish an instrument for destroying lice and ticks upon sheep and cattle by fumigating them with tobacco smoke.

CHURN.—M. BRATT, Maysville, Kentucky.—This invention is designed to furnish a churn, so constructed and arranged that the air may be forced into the churn beneath the dasher, to lessen the time required for the operation of churning, and increase the yield of butter.

HANGING OF GATES, DOORS, ETC.—W. T. WELLS, Decatur, Ill.—This invention consists in so hanging a gate, etc., that it can be adjusted either in a vertical or horizontal plane, without unscrewing or partly detaching it from its hinges or removing and re-setting them.

WASHING MACHINE.—JONATHAN J. GREEN, Grand Rapids, Mich.—This invention consists in the combination of a flexible concave with a fluted cylinder, the peculiarity of the concave being that it consist of a series of ribbed slats, joined together by a flexible belt, whereby it is enabled to rise or fall, so as to adjust itself to the clothes between it and the cylinder.

APPARATUS FOR DRYING DISHES, PLATES, ETC.—C. W. SCHNEIDER, New York City.—This invention relates to a box or stand which is provided with one or more shelves to receive the dishes, plates, etc., to be dried, and with steampipes or other suitable heaters, in such a manner that dishes, plates, and other similar articles, when placed on said shelves after they have been washed, will dry rapidly by the action of the air, and the use of a towel for wiping such dishes, plates, etc., in order to get them dry, can be dispensed with.

TACK EXTRACTOR.—F. M. OSBORNE, Dover Plains, N. Y.—With this implement tacks, etc., can be drawn with the utmost ease, and with but little labor or trouble.

LOOM FOR WEAVING HATS.—PHINEAS LESSON SLAYTON and CHARLES I. KANE, New York City.—This invention is an improvement in the loom described in Letters Patent, granted to William Lesson Slayton, February 2, 1864, and November 22, 1864, where the distinct sets of weaving mechanism are employed, whereof one weaves the crown and brim of a hat, and the other the cylindrical side crown, the two sets being so arranged in the same frame that the warp carriers can be transferred from one set to the other at pleasure during the progress of the work for the purpose of weaving the different parts of a hat in due order.

CORK TONGS.—J. T. ASHLEY, Brooklyn, N. Y.—With the cork tongs embraced in this invention corks can be freely and easily withdrawn from bottles, whether in their necks or inside.

CATTLE GAG.—WILLIAM KROG, Lasalleville, N. Y.—This invention is designed for holding open the mouth of an animal for removing from its throat anything which may be choking the animal.

PROCESS OF MAKING LEAD FROM DROSS AND SCUMMINGS.—CHARLES PICKERING, St. Louis, Mo.—This invention consists in treating dross and scummings made from lead by smelting with sulphur, saltpetre, and asafetida in suita ble proportions, in such a manner that the metallic lead contained in said dross and scummings is separated from the impurities mixed therewith, and a large quantity of lead is saved which is otherwise thrown away as waste.

MACHINE FOR CRUSHING GRAIN, ETC.—CHARLES P. BENOIT, Detroit, Mich.—This invention consists in the employment or use in a machine for crushing grain and other materials, of two rollers, one of which is grooved in a longitudinal, and the other in a transverse direction, in such a manner that the grooves of one roller hold the grain or other material to be crushed in position for the other to act upon, and a machine is obtained by which the operation of crushing grain, etc., can be effected with ease and facility, and with comparatively little expenditure of power.

PIN FOR FASTENING BUTTONS, SHAWLS, ETC.—A. LINDSAY and MYRON MOORE, Malone, N. Y.—This invention relates to a new and improved mode of attaching studs, breastpins, etc., to clothing, so that they are less liable than heretofore to become accidentally detached and lost; and also to an improved device for releasing or detaching the same.

CAR TRUCK.—JOHN S. HOWARD, Schenectady, N. Y.—This invention relates to a new and improved application of elliptical springs to a car truck, whereby the truck is allowed to rock or vibrate freely, and much wear and tear of the running gear of the car avoided.

MACHINE FOR CREASING, SLICKING, AND SKIVING LEATHER.—C. C. BELLOWS, New Ipswich, N. H.—This invention relates to a new and improved machine for creasing, slicking, and skiving leather, and it relates to an improved means for supporting the lower adjustable collar, whereby the latter is prevented from springing as the leather is drawn between the two rollers. The invention also consists in a novel application of a skiving knife and also of the lower roller, adjustable collar, and in the application of a saddle-skirt creasing device, whereby a very efficient device is obtained for the manufacture of leather straps for harnesses, and the creasing of saddle skirts, etc.

PLOW.—JAMES L. ROBERTS, Brunswick, Ga.—The object of this invention is to obtain a plow of simple and cheap construction which will be strong and durable and have a reversible land side.

WASHING AND WRINGING MACHINE.—JOHN LAMB, Jeffersonville, N. Y.—This invention is designed to furnish an improved washing and wringing machine, and it is so constructed and arranged that the clothes may be rubbed more or less as may be necessary, and then wrung by the same operation.

BROOM HEAD.—JOHN HARRIS, Marquette, Wis.—This invention is an improvement in the construction of Harris's broom head, patented May 1, 1866.

PLASTIC ROOFING.—WILLIAM L. POTTER, Clifton Park, N. Y.—This invention is designed to furnish an improved, cheap, temporary roofing for light structures, such as tents, shanties, car tops, decks, and roofs generally.

FEED CUTTER.—WILLIAM F. ALEXANDER, Johnstown, Pa.—This invention is designed to furnish an improved cutter, simple in construction, durable and cheap; and which will do its work readily and at the expense of comparatively little power.

STITCHING CLAMP.—WILLIAM W. TAYLOR, Newark, N. J.—This invention consists in combining a toggle, lever and jointed bars with the jaws of the clamp in such a way that the said jaws may be both opened and closed with the foot of the operator, leaving both his hands free to be used in adjusting the work.

CHURN DASHER.—N. H. SPENCER, Canandaigua, N. Y.—This invention consists in making the dasher bowl-shaped with horizontal holes through its sides around its lower edge, and with two or more valves in its upper part around the base of the dasher handle.

GARDEN AND POTATO FORK.—J. S. PATTERSON, Whitney's Point, N. Y.—This invention consists in the combination of a triangular fulcrum with a fork, for the purpose of furnishing a means by which weeding may be done in a garden and potatoes or other vegetables dug, thoroughly, easily and rapidly.

PUMP FOR COMPRESSING AIR, ETC.—J. F. DEBTMOUT, Newark, N. J.—This invention consists in the employment or use, in an air-pump, of two cylinders of unequal diameters fitted with pistons which operate in opposite directions and communicating with each other by means of a pipe provided with valves at both ends, the valve next to the largest cylinder being made to open outward and that next to the smallest cylinder inward, in combination with a suitable supply pipe extending to the large cylinder, and a discharge pipe connecting from the small cylinder, each pipe being provided with a valve, that in the supply pipe opening inward, and that in the discharge pipe opening outward, in such a manner that when the piston in the large cylinder descends, the air contained in the same is compressed in the small cylinder, and in the down stroke of the piston in the small cylinder the compressed air contained therein is forced down into the reservoir containing compressed air, or into the well containing gases under a high pressure, and thereby much power is saved.

PIPE STEM.—CONSTANTINE HINGERER, New Brunswick, N. J.—The present invention consists in the arrangement of a curved tube leading from the upper part of the pipe stem down close at the inner surface of the cup, and bent in such a manner that when the pipe is laid down on either side the mouth of each curved pipe is elevated and the water or liquid in the cup is not permitted to run up into the stem.

TRANSMITTING MOTIVE POWER.—B. T. SMITH, Nashua, N. H.—This invention relates to a device intended to transmit motive power from a revolving shaft to a revolving cutter or brush, or to any other article which is secured to a handle and arranged in combination with a universal joint in such a manner that said handle together with the brush, cutter or other article can be freely turned in either direction without interfering with the motion of said brush, cutter or other articles, or with any part of the mechanism which serves to transmit the power from the revolving shaft to said brush, cutter or other article.

COUNTER-SUPPORTER FOR BOOTS AND SHOES.—JOSEPH REILING Aurora, Ill.—This invention relates to a counter-supporter which is provided with a bottom flange and with a hole in its top end in such a manner that the same can be firmly screwed between the inner and outer sole and also at its upper end to the counter, and that a supporter is obtained which effectually prevents the counter working on one side, keeping the same straight as long as the boot or shoe will last.

HAY ELEVATOR AND CONVEYOR.—A. D. HINMAN, Stepney Depot, Conn.—This invention relates to a new and improved device for elevating and conveying hay for the purpose of depositing it in barns.

THE MARKETS.

The state of business is somewhat unsatisfactory. Prices, although unusually high and with no prospect of abatement, are considered by sellers unremunerative. Money is plenty at low rates, and accommodation on fair paper is easily obtained. But this does not seem to have much effect on business generally. The cautious purchases of country merchants this fall have induced our dealers to offer inducements for long credits, a mode of doing business which we hoped had passed by. Our exports of flour and grain for the last month have been daily decreasing, while prices have not only been maintained, but have advanced; yet the incoming crop is a good one. The state of business generally is an anomalous one.

ASHES—Pots are in demand, but the supply is limited. Prices advanced to $10 00@$10 12½ ₱ bbl. Pearls are scarce, at $14.

BRICKS—Prices advanced. Common Hard, $15@$15 50. Croton, $18@$20. Philadelphia front, $60.

COAL—Foreign scarce and in demand. Lehigh, at Elizabethport, $7 50. Cumberland, at Georgetown, D. C., $5 50. Freight on Cumberland $1 25. Stove retails at $7 50@$8 50.

COFFEE—Demand for Rio, Laguayra, 23½@19c., gold; 36c., currency. Costa Rica, 20c. Java, 25½c.

COPPER—Detroit, 31@31½c.; Portage Lake, 31½c.

COTTON—Market fluctuating from reports of the English Market and of frosts at the South. Prices have, however, receded to the level of our last quotations. Ordinary, 28½c.; Middling, 30½@30½c.; Good Middling, 31@31c.

FLOUR—Prices have advanced. The supply hardly keeps pace with the demand. Common brands, $11 50@$12 25; Ohio fancy, $12 00@12 25; Genesee extra, $13 50@$15.

GRAIN—We notice considerable advance in prices. Milwaukee, Spring, $2 35@2 40; Amber, $2 00@$2 12. Canada White, $2 20@$2 25. Rye—$1 20@$1 30 for old, and $1 40 for new. Barley, Canada West, $1 20@$1 25, duty paid; Western, $1 15.

IRON—Scotch Pig nearly. Prices have advanced. Stonycreek, $60@$65. American $45. Bar, refined, $100@107 50.

LATHS—Are firm, with sales of Eastern at $4 25.

LEAD—Market dull. Pig 10½ currency. Bar, 11; and Sheet and Pipe, 12½c.

LEATHER—The market for Hemlock Sole is very firm, with a fair demand. We quote Rio Grande and Buenos Ayres Light Weights, 32½@33c.; Middle do., 34½@35; Heavy do., 36@37; California Light, 32@33½; Middle do., 34@35; Heavy do., 36@37; Orinoco, etc., Light, 29@30½; Middle do., 32@33; Heavy do., 34@35; Slaughter Upper in Medium, 36@38.

LIME—The market for Rockland is steady at $1 70 for common, and $2 10 for Lump, cash. Rosendale Cement, $1 75, cash.

LUMBER—The market for Eastern Spruce and Pine is moderately active, with sales at $23 50@$24, usual terms.

MOLASSES—Centrifugal and Clayed Cuba, part mixed, 49@51; Cuba Muscovado, 46@51c. Barbadoes, at 55. Porto Rico, 55@57c.

NAILS—Cut may be quoted 7@7½c., the lower rates for lots of 200 kegs and over—6d., 10d., 8d., and 4d. Fine are very scarce—Clasp, 8½ (6d are very scarce); forged horse, 18; pressed do., 15@16; copper, 50; yellow metal, 30; zinc, 20; and wrought ship and boat spikes, 7@8, cash.

SUGAR—Refining Cuba, 10½@11½. Refined, 16½@16½ for hard; 15½@15½, soft white; 14½@14½, yellow. Crushed and granulated 16c.

WOOL—The market is greatly depressed; very little disposition to purchase on the part of jobbers or manufacturers. Unwashed Western, 31½c.; choice washed, 46@50c.; Picklock, 30@32c.

ZINC—6½c. less 6 per cent. for gold; 10½c., currency, for Lehigh.

Notes and Queries

J. P. W., of N. Y.—*Spiegeleisen* is a term used to denote iron containing manganese. It is from two German words meaning "mirror iron," or "looking-glass iron," and is so called from its brilliant crystals. It occurs from a spathose ore found in Germany, and is a combination of four or five per cent of metallic manganese with ordinary iron. It is used to give hardness to the soft iron made by the Bessemer process, but adds carbon as well as manganese to the melting. Manganese for which *spiegeleisen* is ordinarily used, can be obtained measurably if not entirely free from carbon, by treating its oxide with charcoal, both in lumps. Iron, however, is the best vehicle for manganese, as alone it has too great an affinity for oxygen.

F. M. E., of Mo.—Rubber belts can be kept from slipping by powdered rosin. The heat of a boiler is injurious to either leather or gum belts. It burns one and softens the other.

M. C. J., of N. Y.—Oil for tempering should be animal, as whale or fish oil. Tallow is good for small tools. Any steel worker or dealer will direct you to the best quality of steel for the tools you wish to make and the work you wish to do.

O. W. L., of Ind.—A good hydraulic cement for your aquarium can be made from powdered pipe clay, three parts by weight, to one of oxide of iron, mixed with boiled linseed oil sufficient to form a paste. Aquariums put together with thin strips of rubber in the joints are, however, preferable.

C. D. B., of Md.—Mucilage from gum tragacanth is merely the maceration of the gum in water. If you cover the bottom of a common mucilage bottle with the dry gum, water will swell it in a few minutes, if stirred, to nearly fill the vessel. Starch paste is not applicable to all the uses of mucilage. It will not take the place of the gluten used on postage stamps and envelopes. As a mucilage for ordinary and frequent use it is excellent. All these preparations may be prevented from souring by adding a little alcohol to the water, and may be perfumed by the use of *eau de Cologne* or essences.

A. L., of N. Y.—You ask: "Is it possible to hear a shot or shell fired from a gun pointing toward you, the distance between you and the gun being two or three miles?" Certainly it is. Sound travels, in a temperature of 60 deg., over 1,100 feet per second, and the force is a constant one, losing nothing by distance; whereas the initial velocity of a cannon ball varies from 1,300 to 1,600 feet per second, perhaps sometimes exceeding the latter number. This is, however, a constantly and rapidly decreasing quantity. In shooting four miles under any circumstances the sound of the explosion would precede the arrival of the shot.

J. D. F., of Washington, D. C.—We do not know and cannot ascertain any thing of the oil company you refer to. The best lubricating oil is unquestionably sperm. Olive and lubricating petroleum rank in our estimation next.

W. and S. H., of N. C.—Your question, "how long would it take a train of powder six inches deep and a mile long to burn," does not furnish sufficient data for a direct answer; moreover, such an answer would require experiment, which would be inconvenient for us to perform. The rapidity of burning of trains of powder depends upon a variety of circumstances in addition to the quality of the powder. A train of powder contained in a paper tube may be made to burn explosively and at the rate of over a hundred feet in a second. The burning of a train a mile long would be notably affected by the pressure of the atmosphere.

A. L., of Vt.—Liquid glue is made by dissolving glue in acetic acid No. 8, or by adding to ordinary dissolved or melted glue, a small quantity of nitric acid (1 oz. acid to 1 lb. of dry glue) and boiling. A good cement for glass and china ware is made by mixing the white of an egg with quick lime. Another favorite cement is shellac, applied melted, or dissolved in alcohol.

"O. G." thinks the deck houses or cabins of vessels as well as the galleys should be only temporarily secured to the deck, so that in case of danger they could be detached and serve as rafts. The idea is not new, but has never been considered practically useful.

Improved Patent Rotary Pump.

Few implements or machines have been devised which have been subjected to so many modifications as the pump. There was a time when rotary pumps, on whatever plan constructed, were unpopular. The prejudice is, however, fast disappearing before the unanswerable logic of facts. Rotary pumps are made which cannot be surpassed for efficiency and durability by any reciprocating pump. The machine under consideration is of that class of pumps known as centrifugal pumps, receiving the water at the center, forcing it to the circumference, and raising it to the point desired by centrifugal action.

Fig. 1

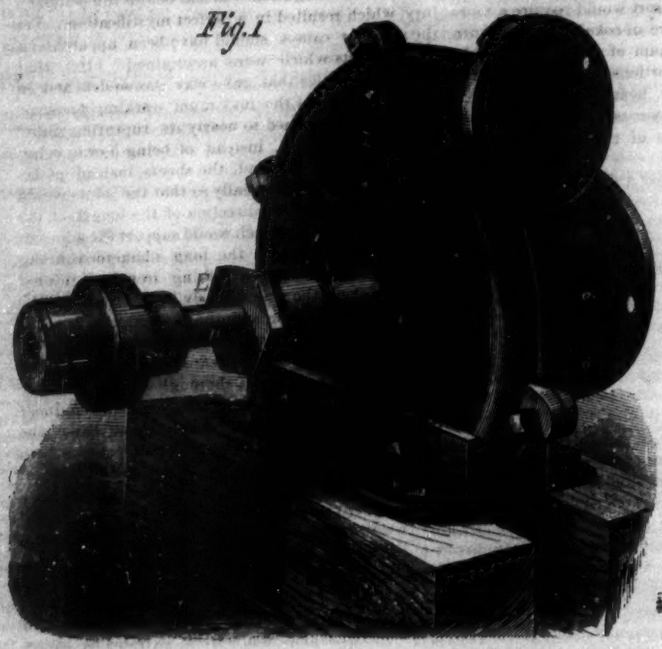
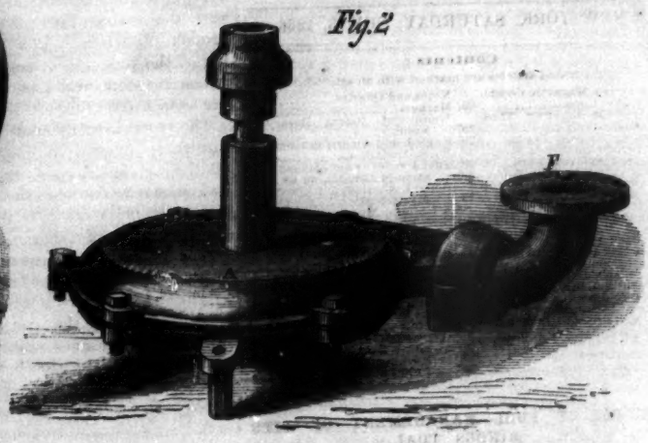


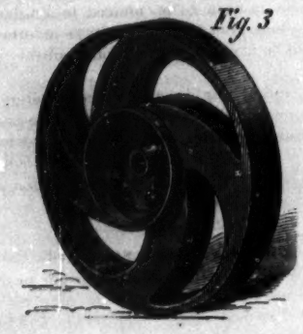
Fig. 2



HEALD & SISCO'S ROTARY PUMP.

The scroll or shell A, is of cast iron, made in halves, and bolted together in the usual manner. Inside is a piston, B, Fig. 3, consisting of a wheel with curved radial arms, the curve being opposed to the direction of rotation. These arms are cored, or cast hollow, opening on the periphery, and communicating with a central chamber, C. This piston

Fig. 3



is mounted on a shaft, D, with suitable bearings, and, on the upright form of the pump, having a gland, or stuffing box, E. It will be noticed that the walls of the chamber, C, project. This projection fits in a corresponding recess on that side of the shell where the water enters, so that none of the water can get between the piston and the outside of the case; it must follow the passages through the arms and be discharged at F. The rim of the piston, B, serves the same purpose, as it fits the interior circumference of the case and prevents the escape of the water from the piston to the inside of the case. This insures a freedom from undue friction and prevents the churning of the water. The combination of these two devices, it is claimed, gives this pump a great superiority over others of similar principle. This pump is equally effective, worked either vertically or horizontally.

It was patented July 25, 1865, by Geo. W. Heald and L. D. Sisco. For additional particulars address Heald, Sisco & Co., manufacturers, Baldwinsville, N. Y.

ENGLISH AND AMERICAN GUNS.

The Shoeburyness experiments, with the nine-inch Woolwich rifle and the Palliser chilled bolt, seem to have operated as a soothing salve to the wounded pride of our English cousins, when, by a personal examination of the *Miantonomoh* and her armament, they were forced to give a reluctant assent to our superiority in the manufacture of naval guns and ships. This assent was given, not in so many words of acknowledgment, but by a general demand on their Government for monitors and large guns.

It cannot be successfully disputed, as we stated in our issue of the 20th Oct., that the results of the Shoeburyness experiments were remarkable. That a bolt of chilled iron, fired from a nine-inch rifle, should penetrate a target of eight inches of solid rolled iron, backed by eighteen inches of teak and a thin inner skin of plate, when the projectile weighed but 25' pounds and was impelled by only 43 pounds of powder, is a reason for gratulation. But it affords no adequate reason for belittling the performances of the fifteen-inch smooth-bore, or the twelve-inch rifle of the American pattern.

That this is the *animus* of an article in the *Engineer* of Oct. 12th, is apparent. We have no disposition to follow the editor of that journal in his four-column attempt to prove the inferiority of American ordnance, but simply to draw attention to some of his admissions. While doubting the actual existence of 20-inch guns, and repudiating the idea that they can bear a charge of 140 pounds of powder, the editor intimates the expediency of constructing 15 and 20-inch rifled wrought-iron guns. This sounds queerly with the following from the same article:—

"We believe that, at this moment, *the nine-inch English rifle is the most powerful weapon in the world*; but it would be folly to attempt to maintain that it will retain this supremacy for any lengthened period; and it is much better that we should try our 'prentice hands at making fifteen-inch guns in time of peace, rather than have their construction forced upon us in time of war."

According to a carefully-prepared table in the same article, the *Engineer* demonstrates, to its own satisfaction, that the American fifteen-inch smooth-bore cast-iron gun is inferior to the English rifled wrought-iron piece, yet the comparative results of the Fortress Monroe and Shoeburyness experiments, on which the article is based, appear to be insufficient to allay well-grounded apprehensions.

The *Engineer* further says: "It must not be forgotten that the nine-inch (English) shot is rifled, while the fifteen-inch shot (American) is spherical, and, therefore, in traversing a given distance the velocity of the American projectile, and consequently its efficiency, will be greatly reduced, as compared with those of the rifled bolt, because the sphere offers most surface to the resistance of the air. It may be assumed with safety, that the velocity of the spherical shot will be reduced one-tenth in traversing the first 500 yards after leaving the gun, while that of the rifled projectile will not be appreciably diminished in accomplishing the same distance."

The conditions of the test, then—which the *Engineer* seems determined to make it—are very unequal in these respects. But there are other important considerations to be noted before a comparative test can be deduced from the two experiments. In the case of the Fortress Monroe trial, the object sought was to ascertain the power of granite walls to resist heavy shot, and the desirability of protecting them with iron plating. The Shoeburyness experiments were to ascertain the resisting force of the plated broadsides of ships. In the first case the distance fired was 350 yards; in the latter only 200 yards, and a rifled gun was used for the latter, while the parallel is sought to be drawn between that and the smooth-bore used in the former.

The composition as well as the form of the shot is another important element. In the Fortress Monroe tests the shot was of ordinary cast iron; in the Shoeburyness trial of hardened steel and the Palliser chilled iron, which, so far, seems to be the best material for penetrating qualities as yet used. This last fact, as we intimated in the SCIENTIFIC AMERICAN of the 27th Oct., is the evident cause of the success of those experiments, rather than the description of gun from which the shot were fired.

The most significant comment, however, on the criticism of the *Engineer* in addition to its own recommendation to copy our example in constructing fifteen and twenty-inch guns, is the following from *Ryland's Iron Trade Report* of Oct. 6th:—

"Government has ordered one of the fifteen-inch Rodman guns, with improved carriage, shot, and powder, from the United States. This is a great step in the right direction. It would be obviously premature and even dangerous to come to an absolute decision on the question of guns and projectiles while we are still so completely in the dark as to the merits of the American system. The gun is likely to arrive in this country in six or seven weeks. It is strange the late Government never thought of so practical a mode of settling the question between British and American ordnance."

Photo-Medallions.

This is a new way of producing portraits in relief or medallion style, in plaster, resembling marble sculpture. A photographic print is first made upon wax, clay, or other suitable material, and then, by mechanical means, an intaglio is sunk, from which plaster casts—forming beautiful, accurate likenesses in relief—are produced at a comparatively small expense. Mr. G. G. Rockwood, of 839 Broadway, New York, one of our most enterprising photographic artists, has shown us some fine examples of the "Photo-Medallion."

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THE USE OF FUEL—MANAGEMENT OF BITUMINOUS COAL.

In our last issue we published a few practical suggestions in relation to the management of fires of anthracite coal. We made the general statement that mineral coal was a condensed form of carbon, requiring a large amount of oxygen to produce perfect combustion.

Bituminous coal contains more of the resinous qualities of the vegetable matter from which all coal is derived, than anthracite. It is largely used for the production of illuminating gas, and, where it is employed for heating purposes, supersedes, in some measure, the use of other artificial lights in dwellings. In our own experience we have read, many an evening, by the light of a generously large grate filled with glowing coal. When a lump was placed upon the fire, for a time a volume of dense, black smoke would rush up the chimney, until the heart of the block was warmed by the persistency of the fiery mass below, when it would crack open, sometimes with a report, and send up blue and then bright yellow flames, illuminating the whole room. One thing was noticeable, and that was, that when such a fire was first kindled it would give out no appreciable heat. The energy of the fire seemed to be directed to overcoming the resistance of the fuel. The blue, gaseous flame was somewhat like the popular idea of the moon's light, without heat, yet this blue flame was a highly combustible gas, if it could have been retained long enough in contact with the heat to have mixed with sufficient oxygen. Its value as a fuel was lost by being forced up the chimney to the outer atmosphere.

In the burning of bituminous coal in open fires there should be first a proper grate. Almost all the grates used for this purpose, in dwellings and other buildings, for warming purposes, are too coarse. They allow the finer particles of coal to pass through and get lost in the ashes; or, these particles induce another fire below the grate and tend to melt it down rapidly. When bituminous coal is used in large lumps, much of its valuable carbon is wasted in the form of gas or black smoke, before it can be ignited and give out any heat. The coal should be fine enough to be easily heated and ignited. The sooner this is done the quicker is the fire, and the more the carbon of the coal is utilized. For this reason a finer grate than is generally used, and smaller coal than that commonly placed upon the fire, is an economical method of utilising the greater portion of the carbon. The grates now in use can be readily changed to effect this saving by placing a sheet of iron, closely perforated with small holes, upon the inside of the grate bars. We have tried this plan with excellent results.

These remarks are not of universal application; for there are several varieties of bituminous coal, some so nearly approaching pure bitumen as to melt in mass and cake, refusing to be separated permanently until well coked. This sort would require a more open grate or an admixture of coke to make it burn freely. Coke is the residuum of bituminous coals, from which the volatile portions have been driven off, in the form of gas, by heat. It is measurably pure carbon, and of so porous a structure as to readily admit the passage of the atmospheric air through the mass.

The philosophy of blowing a fire is simply forcing a larger relative amount of oxygen into connection with the carbon than the ordinary draft would furnish. It acts, also, in a mechanical way, by driving off the products of combustion, the principal of which, carbonic acid gas, is as inimical to a clear fire as to animal life.

The proper management of a fire then, consists in furnishing oxygen in quantities sufficient to burn all the carbon. A good draft is necessary, and the coal should be fed upon the fire in small quantities. If a dense, black smoke is the result of replenishing the fire, some of the most valuable parts of the carbon are carried, unconsumed, up the chimney and entirely lost. The fire should be kept always bright and it will, to a great extent, consume its own gases before they can escape. As in anthracite, so in bituminous coal, the remains of the fire are valuable. The unconsumed coal is more or less coked and will more readily ignite than the green coal. None of this should be wasted.

A little attention to the management of fires in our dwellings, by those who understand the philosophy of combustion, would result in a large annual saving. Even the most ignorant servant can be readily taught how to regulate the supply of fuel and air by a few simple directions, whether the science of fire and fuel is understood or not. It should always be remembered that the pure white or yellow flame is that which yields the heat. Dark smoke and blue gases are not the results sought for in burning fuel.

BOILER EXPLOSIONS NOT ALWAYS MYSTERIOUS.

At intervals, recurring with terrible frequency, the readers of our public journals are startled and shocked—if familiarity has not induced callousness—by accounts of steam boiler explosions, attended always with loss of property, and often with loss of life or limb.

To no other subject is the old adage, "in too much discussion the truth is lost," more applicable than to that of boiler explosions. The cause of these catastrophes has been so muddled by wordy dissertations, mysterious theories, and senseless conjectures, that few think of looking directly at the facts of each individual case and deciding each on its own evidence. Mysterious agencies, under the names of "contraction," "expansion," "electricity," "development of explosive gases," and others, figure conspicuously in the reports of committees of inquiry. The causes which are most obvious, or could be most easily ascertained, are overlooked, and the investigators go prowling about among unknown or not understood forces, to find that which frequently is before their eyes. Braces originally too weak, corroded, or improperly located; plates running longitudinally instead of circumferentially; defective riveting; plates weakened by large holes not filled with the rivets; deficiency in the thickness of plate; poor iron, and carelessness in calking, are overlooked, to say nothing of corrosion from impure water, hard firing, or neglected water feed, and incompetent attendants.

Sometimes, in riveting, the holes in the plates diverge half their diameter, and they are reamed to a circular form, or enough to admit the ordinary rivet, which cannot fill the space, and depends for its security wholly on the juxtaposition of the heads with the surface of the plates. Heat expands the iron, loosening the rivets, the water works through, and, if containing salts, rapidly oxidises the iron, opening the way for a rupture. The careless use of the calking chisel sometimes cuts into the plate one-third or one-fourth of its thickness, so that when an explosion occurs the line of the fracture follows the channel thus made, as the breaking of glass follows the diamond scratch.

In connection with these remarks we cannot help referring to an accident on a fine steamer only a few months ago, by which a number of persons lost their lives. An investigation was had before the coroner's jury, which resulted in a perfect mystification. Yet the cause or causes should have been apparent in several facts which were ascertained. First, that part of the boiler that gave way was so deficient in substance that, at the maximum working pressure, the iron was strained to nearly its rupturing limit; the factor of safety, instead of being 5 or 6, being hardly above 0. Second, the sheets, instead of being placed circumferentially so that the joints would not be so long in the direction of the length of the cylinder, and so that each would support the adjacent ones, were placed with the long diameter running lengthwise. Third, the calking iron had injured the iron along the seams nearly 20 per cent, and the braces were placed in an improper manner.

It can scarcely be contended that this was an exceptional case. It is to be feared that many of our boilers would not stand a thorough scrutiny on these points. Mr. Edward B. Martin, an eminent engineer of Stourbridge, England, recently read before the Institution of Mechanical Engineers a paper which exhibited the following facts:—During the present century there have been 1,045 boiler explosions in England, causing the death of 4,076 persons and injuries to 2,903. Of the 1,045 explosions, 307 were "uncertain" as to cause; 137 were from over-pressure, from the wedging or over-weighting of safety valves, or from other acts of carelessness; 119 from collapse of internal flues; 114 from shortness of water, or from incrustations, and 9 from extraneous causes not immediately connected with the boiler. From these facts Mr. Martin expressed himself as opposed to all ideas of internal detonation, spontaneous generation of explosive gases, or other mysteries.

If this is approximately a correct exhibit of the causes of boiler explosions in England, need we look for some mysterious and unknown agency to account for similar occurrences here? It is well known that English mechanics and engineers are held to strict accountability by the laws, much more so than in this country. It may be claimed that the tenacity of American boiler plate is superior, and such extreme caution as is enforced in England is unnecessary here; but in this matter as in others it is "better to be foolishly careful than foolishly careless."

We believe that a rigid examination of boilers and a thorough oversight and testing during the process of manufacture, as well as after completion, enforced by legislative penalties, would prevent some, at least, of the destructive explosions we are too often called upon to deplore.

A Uniform Money Standard.

France, Italy, Switzerland, and Belgium have recently entered into a convention to regulate the currency of their respective governments, and bring it to a uniform standard of weight, value, and form. They agree not to coin, nor allow to be coined, bearing their impressions and designs, gold money in any other forms than those of gold pieces of 100f. 50f., 20f., 10f., and 5f., fixed as to weight, values, allowances for loss, and diameter according to a certain scale. A fixed regulation allows for wear and loss. The convention also fixes the denominations, values, sizes, etc., of silver coins, and also restricts the amount to be coined by each country to a certain proportion to their respective populations.

This may be regarded as a step of very great importance in commerce. Its effect on the social improvement of the people and civilization generally will be very marked. To make the change more effective, the United States and England should join the convention, which would ultimately compel the co-operation of every European nation. The distinctive legends of each nation will, of course, be retained on their coins, but the values of the coins would be identical with those of similar denomina-

tions belonging to other countries. The annoyances of small exchanges would be reduced, if not entirely removed, and the loss by brokerage be avoided.

NEW PUBLICATIONS.

THE AMERICAN HOUSE CARPENTERS' AND JOINERS' ASSISTANT. By Lucius D. Gould, Architect.

This is the title of a large quarto volume, in which the science and practice of building wooden structures is fully treated. It is illustrated with forty-four lithographic plates, and gives directions not only about doing work, but upon the use of mathematical and drafting instruments. Valuable tables of the relative strength and other properties of materials, and other useful information make this a valuable *vade mecum* for the practical workman.

ATLANTIC MONTHLY.

The number for November is very excellent in every respect. The Publishers announce, for 1867, a Serial from Dr. O. W. Holmes, a series of articles from James Parton, and frequent papers from James Russell Lowell, in addition to their regular contributors. Ticknor & Fields, Boston.

ADDRESS ON PRESENTING TO JOHN ERICSSON THE RUMFORD MEDAL OF THE AMERICAN ACADEMY. By E. N. Hosford, late Rumford Professor in Harvard University.

We have received from the author a copy of this pamphlet which is valuable as giving a *resume* of the inventions and valuable discoveries of this distinguished engineer. It states that Ericsson built the first successful propeller having all its machinery below the water line—the *Francis B. Ogden*—which was rejected by the Lords of the Admiralty of England, on the ground that "it would be impossible to steer a vessel where the propelling power was so near the rudder." Mr. Ericsson came to this country, bringing the machinery of the *Robert F. Stockton*, and shortly after built for the Government the screw steamer *Princeton*. The idea of the monitor class of war vessels was conceived by Ericsson in 1854, when he submitted to the Emperor Napoleon a plan for such ships. Capt. Coles, of the English navy, dates his first idea in 1860. Capt. Ericsson is well known for his hot air engines, but his crowning glory is the total change in war ships, inaugurated by his celebrated *Monitor*. The pamphlet is published by Hurd & Houghton, Boston, Mass.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION, January, 1866.

This Report we shall take occasion to employ hereafter in the elucidation of several subjects upon which it briefly treats. In the meantime we may state that it contains information of general interest on many matters of importance.

HUSSEY, WELLS & Co., of Pittsburgh, Pa.,

In reply to the ninth question of the U. S. Revenue Commission, have published a pamphlet consisting mainly of the certificates in favor of their cast steel. These are unanimous in praise of its evenness and excellent qualities.

LECTURES ON AGRICULTURAL CHEMISTRY. By Prof. S. W. Johnson, Yale College.

A series of four lectures, illustrated with cuts, and the facts exemplified and made practical by experiments. The subject of chemistry as applied to the tilling of the soil is treated in this pamphlet in Prof. Johnson's usual lucid and practical style. He has already done good service to the agriculturists of the country by his lectures, occasional addresses, and publications on this subject.

CURIOUS QUESTIONS. By Rev. Henry A. Brann, D.D.

This is a work on mental and moral philosophy, valuable to the mechanician and the natural philosopher merely, or, at least, mainly, because it refers incidentally to the operation of natural laws.

WOODWARD'S ARCHITECTURE.

This neat volume is issued by Geo. E., and F. W. Woodward, at the office of the *Horticulturist*, 37 Park Row, New York. Many of our readers will recollect "Woodward's Country Homes," a valuable volume as a guide to the erection of rural homes. The present volume is the first of an annual series, intended to aid in the building of farm houses, villas, barns, ice houses, and other structures pertaining to country life, as well as to direct in laying out grounds in gardens, orchards, walks, drives, etc. It is profusely illustrated with plans and designs, and forms an attractive and readable volume to those who do not intend to follow its directions, as well as a valuable manual to all who make the country their home.

Inventions Patented in England by Americans.

[Condensed from the "Journal of the Commissioners of Patents."]

PROVISIONAL PROTECTION FOR SIX MONTHS.

2,236.—SLIDE VALVE FOR STEAM ENGINES.—William B. Robinson Detroit, Mich., and Zoheth S. Durfee, Philadelphia, Pa. Sept. 7, 1866.

2,266.—BEER AND ALE.—John Schneider, Williamsburgh, N. Y. Sept. 7, 1866.

2,305.—WATER-POWER ENGINE.—William Lonsdale and William Peete, New York City. Sept. 8, 1866.

2,316.—MANUFACTURING LEATHER.—George V. Sheffield and James F. Coburn, Hopkinton, Mass. Sept. 8, 1866.

2,319.—SEAMLESS METALLIC TUBE.—William F. Brooks, New York City. Sept. 10, 1866.

2,329.—ELECTRIC TELEGRAPH CONDUCTOR.—John M. Batchelder, Cambridge, Mass. Sept. 10, 1866.

2,338.—HORSE RAKE.—Daniel G. Adelsberger, Emmittsburg, Md. and Richard R. Riches, and Charles J. Watts, both of Norwich county of Norfolk, England. Sept. 11, 1866.

2,369.—BRAIDING MACHINE AND WARP REGULATOR.—William Tunstill, Paterson, N. J. Sept. 14, 1866.

2,413.—PRINTING MACHINE.—George Gordon, New York City. Sept. 19, 1866.

2,454.—BRONZING MACHINE.—John K. Lowe, Cleveland, Ohio. Sept. 20, 1866.

2,490.—CUTTING FILES.—Albert F. Johnson, Boston, Mass. Sept. 6, 1866.

ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING OCT. 23, 1866.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

58,964.—SCREW.—John Absterdam, New York City.

I claim the above-described wood screw, with the plain cylindrical portion between the point and the threaded portion, substantially as and for the purposes set forth.

58,965.—GATE.—Henry Adams, Seattle, Washington Ter.

I claim a gate hung to its post by means of a hinge, E, which passes through a vertical slot, I, and is held to the gate by a nut, J, substantially as herein described and for the purpose specified.

58,966.—HOE.—Sherman W. Adams, Wethersfield, Conn.

First, I claim the combination of the blade, a, and handle, b, when constructed and operating substantially as herein shown and described.

Second, The hoe as above described and set forth as a new article of manufacture.

58,967.—FEED CUTTER. — William F. Altfather, Johnstown, Pa.

First, I claim the combination of the inclined or diamond-shaped knife sash, connecting rod or bar, I, and eccentric, F, with each other, and with the driving shaft, C, cutter frame, B, and box, A, substantially as herein shown and described.

Second, The combination of the jaws, P and S, bent levers, O and R, and pivoted cam lever, N, with each other, and with the cutter box, A, support, M, and eccentric, F, substantially as herein shown and described, and for the purpose set forth.

58,968.—MECHANISM FOR OPERATING THE HARNESS OF LOOMS.—William R. Andrews, Mystic River, Conn.

I claim the above specified new and useful harness-operating mechanism or combination, consisting of the tri-armed lever, D, the two cams, E F, the gears, c c, and racks, G H, the spring, I, and the rack-elevating mechanism, the whole being arranged together, and with a pattern chain and its actuating mechanism, substantially in manner and so as to operate as explained.

58,969.—INSTRUMENT FOR EXTRACTING CORKS FROM BOTTLES.—J. T. Ashley, Brooklyn, N. Y.

I claim the slide, F, in combination with the tongs, A, when arranged thereon, so as to operate substantially in the manner and for the purpose described.

58,970.—APPARATUS FOR MOVING BUILDINGS.—Egbert H. Avery, Belvidere, Ill.

I claim the guide keys, D, in combination with the trucks, C' C' B, substantially as set forth.

58,971.—BUTTER WORKER AND PACKER.—Charles F. Barager, Candor, N. Y.

I claim the arrangement of the bowl, B, vessel, I, and slotted lever, D, with the universal joint, E F, and stop pins, d' e, said lever, D, being adapted to admit of the attachment of the ladle, C, and packer, J, and the whole operating substantially as described.

58,972.—PUMP.—A. B. Barlow, Ripon, Wis.

I claim the method substantially as above described of packing the lower joints of the cylinder and said chamber by means of a bottom piece, I, and annular flange or cap, N, and the packing material, a a, secured by them by the aid of a surrounding flange, N', substantially as described.

58,973.—CORN PLOW.—Peter Barnhart, Chillicothe, Ohio.

I claim the adjustable fender, F, and beam, A, in combination with the standards, B B, for the purposes and substantially as described.

58,974.—STRAW CUTTER.—John W. Bartlett, Harmar, Ohio. Antedated October 12, 1866.

First, I claim the arrangement of the fly wheel, fly wheel shaft with two cranks, knife, C, oscillating arm, D, and standard and guide, F, substantially as set forth.

Second, I claim the combination of the crank, g, attached to the end of the fly wheel shaft, the lever, F, and the bent pawl lever, H, with the ratchet wheel and feed rollers, substantially as set forth.

Third, I claim the pawl holder and guide, I, constructed and connected together as set forth.

Fourth, I claim the hinged board, O', with its shaft, F', in combination with the bent spring, S', substantially as and for the purpose set forth.

58,975.—COMPOSITION FOR ROOFING.—F. Bearse and G. E. Hopkins, Barnstable, Mass.

We claim therefor the composition as made of the acid and other ingredients, substantially as hereinbefore set forth.

58,976.—CHURN.—M. Bratt, Maysville, Ky.

First, I claim the combination of the hollow tube, E, having the valve, e', at its upper end, and with the hollow dasher handle, D, having a valve, d', at its upper end, and with the bottom, a', of the churn, A, substantially as herein described and for the purpose set forth.

Second, The combination of the guide rod or plunger, F, with the hollow dasher handle, D, having a valve, d', at its upper end, and with the bottom, a', of the churn, A, substantially as herein described and for the purpose set forth.

58,977.—GRINDING MILL.—Charles P. Benoit, Detroit, Mich.

I claim the machine for crushing grain consisting of the longitudinally grooved roller, B, and the transversely grooved cylinder, C, arranged to operate substantially as described for the purpose specified.

58,978.—CREASING, SLICKING, AND SKIVING LEATHER.—C. C. Bellows, New Ipswich, N. H.

I claim, First, The combination of the slotted standards, B, slotted triple-armed lever, E, springs, I, and rod, G, arranged to operate with the roller, D, when constructed and applied in the manner and for the purpose specified.

Second, The plate, J, having skiving knives, d, attached to or formed on it, and applied to the upper roller, C, by means of the bars or clamp frame, substantially as and for the purpose described.

Third, The laterally-adjustable creasing wheel, F, on the upper roller shaft, operating with the flanged roller, G, substantially as described for the purpose specified.

58,979.—PIANO STOOL.—Joshua Briggs, Peterboro, N. H.

I claim combining with the pillar, c, the spindle nut when made with a wood screw cut upon its outer surface for securing it permanently to the pillar, substantially as described.

I also claim the combination of the pillar, c, base, a, and bolt, f, when the pillar is constructed to receive the bolt through the tube in which the screw spindle plays, and with a seat for the head of the bolt at the bottom of said tube, substantially as set forth.

58,980.—STEAM-ENGINE SLIDE VALVE.—Richard C. Bristol, St. Clair, Mich.

I claim, in connection with a slide valve, the within-described arrangement of rollers, C, mounted concentrically upon the cross bars, C', and between the longitudinal bars, C2 C2, and arranged to operate relatively to the valve, and to the cylinder face, and to the steam chest, substantially as and for the purposes herein specified.

58,981.—AMALGAMATOR.—Edmund Brown, Chicago, Ill.

I claim, First, The revolving and stationary shaft, with apertures and flanges for crowding the quartz out into the lead.

Second, The series of combs attached to the revolving shaft and sides of the kettle, the whole combined and arranged for the purpose specified.

58,982.—WINDOW SCREEN.—Edward Bucklin, Jr., and Sedgwick A. Sutton, North Providence, R. I.

We claim attaching the screen directly to two supporting rails, D and D', in such manner that the width of the screen may be increased or diminished in the same proportion as the lengths of the rails, as and for the purpose described.

58,983.—FARM GATE.—John A. Cheatham, Nashville, Tenn.

I claim, First, The combination of the lever or levers, A A, with the vertical spindle, E, controlling the gate and its latch, with the cam-shaped piece, O, or its equivalent, substantially as and for the purposes set forth.

Second, The combination of the lever or levers, A A, and the spindle, E, with the upper disk, L, the trigger, K, and latch, J, substantially as and for the purpose described.

58,984.—LADDER.—G. Ckertizza, New York City.

I claim the combination of sides so sloping that the narrow end of one sectional ladder fits within the wider end of any other, with the slots, d d' and e e', and the bars, b b and b' b', substantially as described and for the purpose set forth.

58,985.—FAN BLOWER.—Patrick Clark, Rahway, N. J.

I claim, First, The diaphragms, C C, when used in combination with a compound fan blower.

Second, The fan wheel, F F, when constructed with fans or vanes of the form and arrangement with respect to each other as described.

Third, Attaching each fan or vane at its ends to two adjacent arms, as described.

Fourth, The leather packing, D D, when combined with the diaphragms, C C, as described.

58,986.—CORN SHELLER.—William Colwell, Chillicothe, Ill.

I claim, in combination with the cone, B, shaft, C, and hopper, F, the fan, N, and elevator, U, for the purposes and substantially as herein set forth.

58,987.—SAFETY VALVE.—D. G. Coppin and G. H. Clemens, Cincinnati, Ohio.

We claim, First, The valve, C, and tube, m, constructed as above described and for the purpose set forth.

Second, The valve, C, levers, I, weights, D and D', arranged as above described and for the purpose set forth.

Third, The valve, C, levers, I, weights, D and D', tube, m, in combination with annular ring, f, casing, B, sleeve, n, and cap, o for the purpose above described and set forth.

58,988.—CORN PLANTER.—W. H. Cox, Virden, Ill.

First, I claim the perforated, horizontal, revolving plates, m m, in the hoppers, D D, for feeding and dropping the grains of corn evenly in combination therewith, and with the bevel gear wheels, h i, and the pulleys, b d, connected with and deriving their motion from one of the driving wheels, C, constructed and arranged substantially as and for the purposes herein described.

Second, I claim the thimble, a, within the hub of the driving wheel, C, for carrying the pulley, b, in combination therewith, and with the stationary axle, B, constructed and operating substantially as and for the purposes herein specified.

Third, I claim the arrangement of the side pieces, f f, hung upon the axle, B, for supporting the hoppers, D D, and raising and lowering at pleasure with the lever, F, substantially as herein described.

Fourth, I claim the slide piece, G, with the push and pull pawl, O O', for working the seed-dropping apparatus by hand when adjusted for planting corn in hills, in combination with the revolving perforated plates, m m, to which they impart an intermittent motion, arranged and operating substantially as herein described

58,989.—MACHINE FOR STRIPPING THE TOP FLATS OF CARDING ENGINES.—S. L. Crockett and Benjamin S. Mills, Lowell, Mass.

We claim the employment of the lifting and replacing cam formed substantially as herein set forth and shown, and arranged to operate in the manner and for the purpose specified.

And in combination with the lifting and replacing cam, formed and made to operate as herein set forth, the two pins, 1 and 2, in the slide, h, acted upon by the cam, in the manner and for the purpose specified.

58,990.—HARDENING SPRINGS.—George G. Crowell, Lime Rock, Conn.

I claim the employment of glue, or equivalent glutinous animal matter, either alone or in combination with other material, as a hardening compound, when employed substantially in the manner and for the purpose herein set forth.

58,991.—TABLE AND HOLDER FOR SHEARING SHEEP.—A. M. Culver, Bedford, Ohio.

I claim the table, B, arms, C C', pawl and ratchet, a b, and shackle, D, constructed and arranged as and for the purpose specified.

58,992.—KNIFE CARRIER.—Porter E. Cummings, Sanford, Me.

I claim the improved knife carrier, made substantially as described, viz: with the knife-shank socket, and the rebate arranged in it, as set forth, the said carrier being provided with a set screw, or equivalent means of fixing the knife shank in the socket.

58,993.—HAND SEED SOWER.—Obed Dann, Janesville, Wis.

I claim, First, The combination of the box, A, and slide, E, when constructed, arranged, and used substantially as and for the purpose set forth.

Second, The combination of the box, A, cap, B, and handle, C, when constructed, arranged, and used substantially as and for the purpose set forth.

Third, The combination of the box, A, slide, E, cap, B, and handle, C, when constructed, arranged, and used substantially as and for the purpose set forth.

58,994.—BED BOTTOM.—Garret B. Davis and Chas. B. Davis, Freeport, Ill.

We claim the strengthening rods or girders, E E, in combination with the bow-shaped cross pieces, C C, and elastic bands, D, substantially as specified.

58,995.—TABLE.—Ernest Dinter, Boston, Mass.

I claim the improved table stand as having two parts, a b, constructed with receiving slots, arranged in them so as to enable them to be applied together, substantially as set forth.

58,996.—STEAM-ENGINE GOVERNOR.—E. C. Edmonds, Buffalo, N. Y.

I claim the combination of the adjustable clutches, t t', with the slip shaft, G, loose pinions, h h', bevel wheel, K, and spindle, C, for producing an intermittent motion to the valve-operating mechanism, substantially in the manner set forth.

I also claim, in combination with the above, the screw valve

shaft, p, pulley, o, band, n, and pulley, m, for operating the valve, r, arranged and operating substantially in the manner specified.

58,997.—Washing Fluid.—Alfred A. Engoist, San Francisco, Cal. Antedated Oct. 3, 1866.

I claim the compounding of the ingredients in about the proportion, as herein described, in combination with the process, substantially as set forth.

58,998.—Seal for Jar and Can.—Henry S. Fisher, Oakville, Pa.

I claim a seal for preserve jars, cans, and other vessels which is composed of india-rubber, or other equivalent substance, lined or covered with a substance which is saturated with an adhesive cement, substantially as described.

58,999.—Caster for Furniture.—Frederic G. Ford, New York City.

I claim, First, Combining and arranging the caster by leaving a space between the central boss and horn, so that the horn shall be out of contact with the central boss, thereby relieving the caster of much of its friction, substantially as shown and described.

Second, The combination, in a caster, of a central screw and horn, with a plate constructed with the boss, B, substantially as above shown and described.

Third, Constructing and arranging the central boss of the plate with respect to the screw and horn, so that the said boss shall support the screw and not be in contact with the horn, in the manner and for the purposes substantially as herein set forth.

59,000.—Apparatus for Inhaling Gas.—Theodore F. Frank, Buffalo, N. Y.

I claim the above described apparatus for generating and inhaling vital oxygen, consisting of the generator, B, receiver, E, provided with the expanding bag, F, inducation gas and air tubes, f G, with their valves, I I', stop cock, h, and inhaling tub, L, combined, arranged and operating substantially as set forth.

59,001.—Hay Spreader.—C. R. Frink, Norwich, N. Y.

I claim, First, The grooved or double-flanged eccentric wheel or disk, A, combined with a movable plate, a, and cap plate, b, for operating the fork rods, B, in their connection with the spiral springs, C, substantially in the manner and for the purposes as herein set forth.

Second, The movable jointed arms, E, in combination with the brackets, F, for relieving the forks of any straining or undue pressure, substantially in the manner and for the purpose as herein described.

59,002.—Carpet Fastener.—Robert A. Gawler, Concord, N. H.

I claim a carpet fastener consisting of a shank to be driven into the floor of a room, and a hook, horseshoe-shaped, as shown, working in said shank, in the manner described.

59,003.—Cultivator Plow.—William O. Gibson, Charleston, S. C.

I claim the two parallel beams, A A, connected by two cross bars, a, a, and provided with the gage wheel, C, in combination with the bar, d, provided with the colter projection, e, and horizontal blade or knife, D, and connected to the beam, A, by the standards, c c, and the plow, E, attached to the beam, A', all being arranged substantially as and for the purpose set forth.

59,004.—Manufacture of Illuminating Gas.—Henry L. Green, Portland, Oregon.

I claim the combination of saw dust with naphtha, petroleum, or mineral oils, in about the proportions named, for the manufacture of illuminating gas, substantially as set forth.

59,005.—Washing Machine.—Jonathan J. Green, Grand Rapids, Mich.

I claim the flexible rubbing concave, C, in combination with the cylinder, D, constructed substantially as shown and described.

59,006.—Brick Machine.—J. B. Gridley, Albany, N. Y.

First, I claim operating the clay-compressing plunger of a brick machine by means of the grooved wheel, I, or its equivalent, so that said plunger shall be depressed gradually but forcibly, and elevated, and arrested and retarded in its operation at intervals, substantially as and for the purposes specified.

Second, I claim the flanges or projections, R, or their equivalents, for giving motion to one or more levers, which feed the molds to the mud box.

Third, In a brick machine I claim mounting a wheeled follower or mold-feeding device upon tracks, substantially as and for the purpose specified.

59,007.—Cotton-bale Tie.—James H. Gridley Washington, D. C.

First, I claim the cotton-bale, or other tie, so constructed that the fastening is made by the edges of said tie, in connection with corresponding flanges on the opposite end of the tie, or on a separate plate, having said flanges on it, substantially as described.

Second, The plate, B, having flanges, b, cast or otherwise, formed on its edges, in combination with the ends of the tie, when said ends are cut in dovetail form, substantially as described.

Third, The plate, B, having flanges, b, on its edges, and lips, a, as described, in combination with the tie, having a dovetail end with notches cut in the edges of said dovetail, substantially as described.

59,008.—Carriage Jack.—Joshua Hammond, Providence, R. I.

I claim a carriage jack with a fixed standard, B, movable standard, C, levers, E and G, and link, F, constructed and combined substantially as set forth.

59,009.—Curtain Fixture.—Benjamin Handforth, Chicago, Ill.

I claim, in combination with the curtain, A, roller, B, and cord, D, the arrangement of the sheave, E, provided with the groove, a, and one or more oblique grooves, b, operating substantially as and for the purposes specified.

59,010.—Plow.—James Harris, Kansas, Ill.

I claim the attaching of the rear plow, H, to the beam, A, by means of a bent bar, F, projecting laterally from the beam, and having a dovetail groove, d, made in it, to receive the plow standard, in combination with the front plow, E, attached to the standard, D, which is secured to the beam, substantially as and for the purpose set forth.

59,011.—Broom Head.—John Harris, Marquette, Wis.

I claim the combination of the arms, A, pins, B, and serrated bars, C, when said arms, pins, and bars, are constructed and combined substantially in the manner herein described and for the purpose set forth.

59,012.—Cultivator.—J. B. Herman, Mount Vernon, Iowa.

First, I claim the arms, R, applied to the machine, substantially as shown, with the hinged bar, J, chains, Q, and plow beams, L, all arranged substantially as and for the purpose specified.

Second, The curving of the rear parts of the plow beams, L, in combination with the inner laterally-adjustable plow beams, L, substantially as and for the purpose set forth.

59,013.—Cultivator.—John B. Herr, West Lampeter Township, Pa.

I claim the combination and arrangement of the parallel shovel beams, A B, united by the tongue, C, handles, H, and braces, D, when constructed and operating in the manner and for the purpose specified.

59,014.—Shifting Carriage Top.—A. V. Heyden, Milwaukee, Wis.

First, I claim attaching all the supports of carriage top, B, to a single metal plate, C, and fastening the same to carriage seat, A, by means of catches, D and E E, substantially as and for the purpose described.

Second, A carriage top with all its supports attached to metal plate, C, with standards, I I, passing through seat, A, with slots or notches in their lower ends, into which catches, F F, are locked by means of lever, G, and held in position by spring catch, H, together with cross, B, to hold the middle of plate, C, firmly to seat, A, all in combination, substantially as and for the purpose described.

59,015.—Machine for Cutting Tobacco.—Lewis F. Hildebrand, Chicago, Ill.

I claim the combination of the trough, A, face plate, C, the roller, F, knife, D, and the cutting block, G, substantially as set forth.

59,016.—Horseshoe.—Warner Hinds, Worcester, Mass.

I claim the horseshoe, constructed substantially as herein described, as a new article of manufacture.

59,017.—Stem for Tobacco Pipe.—Constantine Hingher, New Brunswick, N. J.

I claim, First, The curved tube, c, applied to the upper part of the cup, B, and operating in combination with the same, and with the conical cap, d, applied to the tube, b, which rises from the bottom of the cup, B, substantially as and for the purpose described.

Second, The secondary cup, c, in combination with the lower end of the stem, A, and with the cork, f, constructed and operating substantially as and for the purpose specified.

59,018.—Hay Elevator and Conveyor.—N. D. Hinman, Stepney Depot, Conn.

I claim, First, The frames, I J, hook, M, and cross bar, L, in combination with the pendent bars, H H, rod, O, and bar, M, all arranged in the carriage, B, and used in connection with the pins, b, in the ways, A, substantially as and for the purpose set forth.

Second, The pawl, P, in combination with the thimbles, W W, on the chain, V, of the hoisting rope, G, the rod, R, and frame, Q, all arranged substantially as and for the purpose specified.

Third, The bent or knee lever, T, connected with the frame, Q, provided with the spur, C', and the signal composed of the bell, Y, and hammer, Z, substantially as and for the purpose set forth.

Fourth, The adjustable bars, D E, placed on the ways, A A, and the bar, E, provided with the hinged plate, X, substantially as and for the purpose specified.

Fifth, The combination of the carriage, B, ways, A, adjustable bars, D E, and pins, b, hoisting rope, G, provided with the protuberance, v, and the chain, V, with thimbles, W W', applied to it, and the frames, I J and Q, rods, O R, hook, M, cross bar, L, and the bent or knee lever, T, all arranged to operate in the manner substantially as and for the purpose set forth.

59,019.—Hat Protector.—Harrison Hodgson, New York City.

I claim, First, The combination with a hat of the movable feet, C, three or more in number, when so arranged and connected that they are projected beyond the crown and withdrawn simultaneously, substantially as described.

Second, I also claim the feet, C, in combination with the radial legs, D, to whose ends they are attached, substantially as described.

Third, I also claim the slotted plate, H, with eccentric slots, i, in combination with the legs, D, which are raised and lowered by giving rotary motion to said plate, substantially as described.

Fourth, I also claim the wrench, F, in combination with the slotted plate, H, to the post, L, of which it is confined through the agency of the screw, C, substantially as above shown.

Fifth, I also claim the shell or casing, K, which covers and protects the slotted plate in combination with said plate, and with the legs, D, substantially as set forth.

Sixth, I also claim the apparatus, substantially as above set forth, in combination with a hat or cap, as above shown and described.

Seventh, I also claim the enlargements on the end of the feet, C, substantially as above set forth.

59,020.—Steam Generator.—Philip Hoelzel, New Orleans, La.

I claim, First, The receptacle, a, when constructed and arranged substantially as and for the purp se herein recited.

Second, Combining with or connecting to a steam boiler the series of cylinders, for heating and purifying the feed water, said cylinders having blow-off pipes and the alternating connecting pipes, arranged substantially as herein set forth.

59,021.—Car Truck.—John S. Howard, Schenectady, N. Y.

I claim the combination of the beam, A, elliptica. spring, D, pendant, F, pivoted bar, G, and the axle boxes, and operating substantially as described for the purpose specified.

59,022.—Corn Plow.—R. C. Howard, Lena, Ill.

I claim the guide rods, O, in combination with the lever, a'', and beams, F, substantially as described for the purpose specified.

59,023.—Fence Post.—William Hunter, Detroit, Mich.

I claim the combination of flanges such as above described with a pointed fence post, in the manner above described for the purpose of making said post, when driven into the earth, firm and immovable and incapable of oscillation, or any other arrangement of flanges so attached which will secure, substantially the same effect.

I also claim the application of such flanges and the arrangement thereof to any article of use designed to be fixed in the earth, whether for fence posts, lamp posts, awning posts or any other article which by substantially the same means can be firmly fixed or driven into the earth.

59,024.—Let-off for Looms.—Daniel Hussey, Nashua, N. H.

I claim the combination of the cam, o, and the impelling pawl, m, applied to the crank shaft as described with the arm, r, and the escapement mechanism applied to the yarn guide and the yarn beam, the whole being to operate in the manner and under circumstances, substantially as set forth.

59,025.—Fumigator.—Isaac Hutchins, Jr., Wellingtington, Me.

First, I claim the cylinder or box, B, constructed as described in combination with the bellows, A, substantially as described and for the purpose set forth.

Second, The combination of the perforated plate, c, with the cylinder or box, B, substantially as described and for the purpose set forth.

59,026.—Sash Fastening.—Benjamin S. Hyers, Pekin, Ill.

First, I claim a rack, B, secured on the pivot, D, when applied to a sash fastener, for the purposes and substantially as described.

Second, I claim the spring, E, in combination with the rack, B, substantially as described.

Third, The toothed wheel, A, in combination with the rack, B, and spring, E, substantially as and for the purposes set forth.

59,027.—Reed Plates for Melodeons, etc.—Gustavus W. Ingalls, Concord, N. H.

I claim the improved reed socket plate, made substantially as described, viz., by punching it through in one direction, and forming the mouth on that side which is opposite to that surface at which the punch is made to enter the metal.

59,028.—Ditching Machine.—Henry C. Ingraham, Tecumseh, Mich.

First, I claim the double mold board plow, H, single mold board, J J, and shute, E, when attached and pivoted by suitable frame work on the axle of the elevating wheel, A, substantially as and for the purpose herein set forth.

Second, The wheel, A, provided with the flanges, a and a', in combination with the endless belt, q, tightening pulley, X, and pulley, I, when arranged to operate substantially as and for the purpose herein set forth.

59,029.—Cistern for Water Closets, Urinals, etc.—Alfred Ivers, New York City.

I claim, First, The receptacles or cisterns, a and c, and siphon pipe, g h, in combination with a float to cause the delivery of water from the vessel, c, for the purposes and substantially as specified.

Second, I claim a cistern for water closets, urinals and sinks to which water is gradually and continuously supplied, in combination with a float and siphon or equivalent mechanism, to effect a periodical discharge by the action of the water of the contents of said cistern, substantially as set forth.

59,030.—Pump.—David L. Jaques, Hudson, Mich.

First, I claim the plunger, b, of any suitable length consisting of heads, F and G, and leather packing, D, at each end lifting valve, l, valve, r, and opening, O, all constructed and operated substantially for the purpose and in the manner set forth.

Second, The combination of plunger, b, space, y y, and pipe, E, for the purpose and in the manner, substantially as hereinbefore stated.

59,031.—Machine for Molding, Felting and Fulling Hat Bodies.—Moses A. Johnson and William Markland, Lowell, Mass.

We claim, First, Molding, felting and fulling for wool or other fibrous material for hat bodies, in a perforated mold and by a cone or former corresponding thereto, and the direct action of steam upon the material to be so molded, felted, and fulled by giving a reciprocating, rotary, and a rising and falling motion to the cone or former while acting upon or with the hat, substantially as herein described.

We also claim, in combination with the cone former having four motions, viz., back and forth, and up and down, given to it, the bowl or mold having a continuous rotating or intermittent or reciprocating rotary movement, substantially as described.

We also claim shingling, creasing, or shouldering the cone or former, substantially as and for the purpose described.

We also claim automatically moving the weight out upon the beam lever, so as to increase the force of the blow of the falling cone or former, as the process proceeds, substantially as described.

59,032.—Combined Fly Wheel and Crank Shaft.—E. B. Jucket, Roxbury, Mass.

I claim the combination and arrangement of the two shafts, their cranks, the fly wheels, and the connecting screw or screws, or the equivalent thereof, the whole being substantially as described.

59,033.—Horse Hay Fork.—Henry Kauffman, York, Pa.

First, I claim the dividing iron, B, which prevents the hay from clogging and stopping the operation of the hooks in their lateral movement, and is provided with the spear head, which facilitates penetration into the hay.

Second, The combination of the hooks, A A, and the removable prongs, E E, arranged for joint operation in the manner and for the purpose set forth.

59,034.—Measuring Funnels.—W. E. Keene, Lynn, Mass.

I claim for a measuring funnel the arrangement of the valve and valve rod, consisting of elastic piston, c, attached to rod, d, by compressing nuts, e and f, within cylinder, b, constructed as described, with holes, m, and exterior graduating bells, and combined with, and arranged in the axis of funnel, A, by means of standards, g, and cross piece, h, all operating together as and for the purpose described.

59,035.—Cattle Gag.—William Kegg, Lasellsville, N. Y.

I claim a cattle gag consisting of a ring, A, and arms, B B, constructed and applied substantially as and for the purpose specified.

59,036.—Fluted Puffing for Shirt Bosoms.—Geo. E. King, New York City.

I claim the within described fluted puffing as a new article of manufacture and made by fluting, by mechanism, and in a regular manner, a strip of muslin or other material, throughout its length, and compressing and flattening down the extremities of the flutes to form straight and regular borders, on either and opposite sides of the flutes, and afterward machine stitching said borders along and at the union of the borders with the flutes, substantially as specified.

59,037.—Spindle Step.—A. P. Kinney, South Carver, Mass.

I claim the socket, A, in combination with the step, B, the latter being provided at its upper end with a cup, d, which rests on the top of the socket, and communicates with the socket by means of one or more holes, e, and also provided with a groove to receive an absorbent material, a, all arranged substantially as and for the purpose set forth.

59,038.—Washing and Wringing Machine.—John Lamb, Jeffersonville, N. Y.

I claim, First, The combination of the rubber boards, L M, crank wheels, P S U, double crank, V, and pitmen, T, with each other, with the crank shaft, B, and with the frame, A, of the machine, substantially as described and for the purpose set forth.

Second, The combination and arrangement of the springs, I, slotted stop, J, rollers, E H, gear wheels, C D, and clutch, F, with each other and with the frame, A, of the machine, substantially as described and for the purpose set forth.

Third, The combination of the rollers, E H, and the rubber boards, L M, with each other and with the frame, A, of the machine, substantially as herein described and for the purpose set forth.

59,039.—Machine for Washing Sand and other Mineral Substances.—Wm. M. Lanehart and Jos. C. King, Cookstown, Pa.

We claim, First, The construction and use of the cistern, a, in combination with an apparatus for washing and raising sand, substantially in the manner and for the purpose above set forth.

Second, The cisterns, a a', one or more, in combination with a corresponding number of elevators and spouts, and the trough, f, the whole being constructed and arranged substantially in the manner, and for the purposes above set forth.

59,040.—Hook Pins for Fastening Wearing Apparel.—Alexander Lindsay and Myron Moses, Malone, N. Y.

First, We claim a pin, A, of spring metal having a part, b, turned back to the body, A, and terminating in a hook, b, arranged and operating as and for the purpose specified.

Second, We claim the pin, A a b, Fig. 1, and releasing slide or ball, D, substantially in the manner and for the purpose described.

59,041.—Clothes Wringer.—John S. Lash, Philadelphia, Pa.

I claim the combination of the jointed compensating link, b, and arms, g, with the non-sliding gear, J, K, and the rollers, C C', substantially in the manner and for the purpose described.

59,042.—Apparatus for Making Paper Pulp.—Henry and Fritz Marx, Baltimore, Md.

We claim the arrangement of the mill stone, B, the boxes, D, followers, X, and feed facing, operated by rack and pinion, band, wheel and weight, as set antially as described.

We claim the arrangement of the longitudinally-shaking shoe provided with inclined sieves in vertical series with separate points of discharge, substantially as described.

We claim the corrugated or rough surfaced grindstone in the relation and capacity described.

59,043.—Feed Cutter.—John Massey, New York City.

I claim the adjustable frame, F, in combination with the knife, I, arranged with the revolving knife cylinder, B, constructed and operating in the manner and for the purpose herein specified.

59,044.—Priming Metallic Cartridge.—Edward Maynard, Tarrytown, N. Y.

I claim a closely-fitting metallic shield or cover in combination with the base of a cartridge when said base is so constructed as to receive solid support from the gun and is primed exteriorly, substantially in the manner and for the purpose herein set forth.

59,045.—Gate.—Oliver C. McCarty, Hayesville, Ohio.

I claim the application of the wires or chains, c c, to ...e loop, E, and to the bar, D, so as to rotate the gate and cause it to return to its original position when closed, and also the rod, B, about which the gate revolves when opened, and also the post, A, upon which the gate revolves.

59,046.—Miter Box.—J. A. McKinstry, Monson, Mass.

I claim the miter box, the parts of which are composed of the adjustable pieces, A A', guide, C, plate, B, hooked rods, D, graduated plate, E, guide posts, F, uprights, G, and expanding rod, A°, when arranged and operating substantially as described for the purpose specified.

59,047.—Discharging Grain from Vessels.—C. H. Merry, Dunleith, Ill.

First, I claim the combination with a vessel of a removable well, A B C D, constructed substantially as herein described and for the purpose set forth.

Second, The combination with the removable well, A B C D, of the gates, F G, one or more, constructed and operated substantially as herein described and for the purpose set forth.

59,048.—Lock.—A. O. Mills, Nashua, N. H.

First, I claim the combination of the sliding frames, C, T-shaped slotted tumblers, D, having spring ends, a, cross bars, c d', and projection, b, of the bolt, B, operating with the bits, e, of the key, F, substantially as described for the purpose specified.

I also claim the fitting of the tumblers, D, in the frame, C, by means of which will admit of changes being effected in their positions by the action of the key alone when the tumblers are retained or held by the projection, b, of the bolt, B, as set forth.

I further claim the forming of the adjustable bits, e, with lips, h, at their ends to permit the slipping of the bits out from the key, as set forth.

59,049.—Mole Plow.—Adam Miller, Chicago, Ill.

First, I claim the cutter brace, F, when attached to a pivoted beam, lever and movable coiter, substantially as specified.

Second, The arrangement and combination of the coiter, F, cutter brace, E, and pivoted lever, B, with the standards, C, provided with ratchet and pawl and beam, A, substantially as specified.

Third, The arrangement and combination of the hooks, I, I, cords, l l, and cross bar, k, with the mole, H or G, for inserting two or more lengths or pieces of drain tile, substantially as set forth and specified.

59,050.—Combined Rake and Spade.—W. H. Miller, Brandenburg, Ky.

I claim the combined rake and spade, made and adjusted substantially as described.

59,051.—Steam Generator.—Thomas Mitchell, Albany, N. Y.

I claim the combination of the means substantially as herein described for generating steam, with the means substantially as herein described for controlling the introduction of the water into the generator, by the pressure of steam generated, as and for the purpose set forth.

59,052.—Medicine.—Lorenzo Olea Moreno, New York City.

I claim a medical compound made as and for the purpose described.

59,053.—Three-horse Splinter Bar.—J. B. Morrison, Fort Madison, Iowa.

I claim the strap, cord or chain, F, with whiffletree, G, attached and applied to the splinter bar, B, and draft pole, A, as shown, when said strap, cord or chain is used in connection or combination with the whiffletree, D E, attached to the splinter bar, and the latter secured to the draft pole one-third the distance of its length out of center, substantially as shown and described.

59,054.—Bridge.—Thomas W. H. Moseley, Boston, Mass.

I claim the improved truss as composed of the arched plate, A, the chord, B, the flanges, C C, or the same and the end strengthening plates, g g.

I also claim the combination of the shoes, D D, and their adjusting screw bolts, k k, and nuts, l l, with the truss made of the arched plate, A, the chord, B, and the flanges, C C, or the same and the strengthening plates, g g, the whole being arranged substantially as described.

59,055.—Steam Jet for Steam Generator Furnace.—David M. Nichols, New York City.

I claim the combination of the steam jet with a divided flue and a valve for one division of the flue, all operating substantially as set forth.

59,056.—Carriage-top Protector.—R. Nickson, Akron, Ohio.

I claim a protector for a carriage top formed of a ground block, A, springs, C, and plate, D, substantially as described.

59,057.—Grate for Heating Stoves.—George Nimmo, Jersey City, N. J.

I claim the sliding grate, b, and plate, l, in combination with the closed hopper, c, fitted and operating in the manner and for the purposes set forth.

59,058.—Stove Cover, Pot, and Pan Lifter.—Joseph B. Oakey, Indianapolis, Ind.

I claim a metallic head, constructed substantially as set forth, in combination with a wood or other handle, in the manner and for the purpose herein set forth.

59,059.—Tack Extractor.—F. M. Osborn, Dover Plains, N. Y.

I claim the hinged support, D, in combination with the handle, A, having pronged end, B, substantially as described for the purpose specified.

59,060.—Gate.—Manning Packard, Clarendon, N. Y.

I claim sustaining the weight of a gate and allowing it a free action by means of two extension bars braced together and running on friction rollers, h h, situated between them, the whole arranged and operating as herein set forth.

I also claim the employment of a series of extension bars, b c d, in combination with rollers, h h, so arranged that the gate may be adjusted higher or lower at pleasure, substantially as specified.

59,061.—Potato Fork.—J. S. Patterson, Whitney's Point, N. Y.

First, I claim pivoting a fulcrum or rest to the lower part of a garden or potato fork, substantially as herein shown and described.

Second, The fulcrum or rest, C, constructed as herein shown and described, in combination with a garden or potato fork, substantially as and for the purpose set forth.

59,062.—Process of Separating and Collecting the Fatty Matter from Wool Yolk.—John M. Pendleton, New Brighton, N. Y.

First, I claim separating the fatty or oily matter making part of the wool yolk from the water or solution in which the wool is scoured, by combining or uniting therewith any of the acids which will separate said fatty or oily matter from said solution, substantially as described.

Second, Straining said fatty or oily matter under pressure through canvas, or other suitable material, for the purpose of purifying the same.

59,063.—Method of Obtaining Lead from Dross.—Charles Pickering, St. Louis, Mo.

I claim the within-described process of treating dross and scummings made from lead by smelting the same together with the ingredients herein specified, for the purpose set forth.

59,064.—Intermittent and Expansive Gearing.—Lyman B. Potter, Putnam, Conn.

I claim the device for an intermittent and expansive gearing, constructed and operated substantially as herein shown and described.

59,065.—Roofing Material.—William L. Potter Clifton Park, N. Y.

I claim an improved roofing formed by the combination of two plates or layers, A and C, of felt or other suitable fabric, with an interposed layer, B, of any plastic roofing cement, substantially as and for the purpose set forth.

And, finally, I claim, when said roofing is constructed as prepared substantially as herein shown and described and for the purpose set forth.

59,066.—Oil Can.—W. J. Prall, Pomeroy, Ohio.

I claim the perforated suspended drop, C, adapted for the purposes described, perforated cap, D, pump receiving tube, E, and cover, G, with projecting recess, F, in combination with the body, A, substantially as and for the purpose specified.

59,067.—Tire-shrinking Machine.—Thomas Pratt, Valparaiso, Ind.

I claim the combination of the flanged bed piece, B, vise, E, gripe, D, and screw, C, when said parts are respectively constructed and the whole arranged substantially in the manner and for the purpose set forth.

59,068.—Heater for Washing Machines.—W. H. Pratt, Davenport, Iowa.

First, I claim arranging chambers, C and D, beneath the perforated-bottom wash box or tube, substantially as described.

Second, The combination with the heater, C D, constructed as described, with a washtub, A B, substantially as set forth.

59,069.—Sounding Board for Pianos.—Frederick E. Ramm, Philadelphia, Pa.

I claim combining with the sounding board of a piano an adjustable bearer or spring by which the sounding board may be raised when from any cause it has sunk or settled below its proper position, substantially as described and for the purpose set forth.

59,070.—Medicine.—William Ranson, Portage, Wis.

I claim the improved medicine, compounded substantially as herein described.

59,071.—Planting Machine.—George Ray, Kinderhook, N. Y.

First, I claim the slide, n2, arranged in relation with the cups, n1, of the carrier belt, H, and with the hopper, G, and tubular standard, G', substantially as herein set forth for the purpose specified.

Second, The slide, h, and elastic rod, f, arranged in relation with each other and with the cam, E, tubular seeding stock, C, and carrier belt, H, substantially as herein set forth for the purpose specified.

Third, The supplementary tubular stock, D, furnished with two slides, I I, and so arranged and operated in relation with the seeding stock, C, as to be capable of dropping a fertilizing material into the hill simultaneously with the dropping of the seed, substantially as herein set forth.

Fourth, The platform, D, arranged below the rearmost end of the frame, A, and in relation with the seat, K, and hopper, G, substantially as herein set forth for the purpose specified.

Fifth, The bent lever, p, link, p', lever, r, rod, r', and arms, s and u, of the transverse shaft, s', so arranged in relation with each other and with the clutch, c, and the bars, B2, of the thills or draft pole that the clutch will be thrown out of gear with the seed-conducting mechanism simultaneously with the raising of the forward end of the frame, A, substantially as herein set forth for the purpose specified.

59,072.—Rafting Pin.—Thos. B. Raymond, Saginaw, Mich.

I claim a rafting pin made in wedge form and having a notch or channel extending up from its point or edge for receiving and grasping a straight rope, substantially as described and for the purpose set forth.

59,073.—Steam Plow.—Owen Redmond, Rochester, N. Y.

I claim the anchors operating substantially as described, or operating them in any manner by which their protrusion and withdrawal are effected in a somewhat similar way.

Second, The eccentric, F,

Third, The removable cam, H, lever and weight or a spring equivalent to the weight.

59,074.—Portable Propeller and Steerer for Boats.—Thomas Reece, Philadelphia, Pa.

I claim the combination of the portable propeller and steering apparatus with the clamps, d and e e', arranged and operating substantially as and in the manner set forth.

59,075.—Counter Supporter.—Joseph Reising, Aurora, Ill.

I claim, as a new article of manufacture, a steel counter supporter constructed as described and applied to the rear portion of the heel, as and for the purpose specified.

59,076.—Stop-mortise Latch.—Francis A. Richardson, Poultney, Vt.

I claim the employment or arrangement of the stop latch, E, catch, L, and slot or recess, F in combination with the movable bar or stop, H, the whole being arranged and operated in the manner and for the purposes substantially as herein described and set forth.

59,077.—Wheat Drill.—Matthias S. and J. S. Rickel, Geneseo, Ill.

First, We claim the hopper, C, provided with communicating apartments, b' b'' c c', as shown, plates, h h' h'', in combination with the agitator, B, suitably operated and provided with the tubes, J and J', arranged substantially as described for the purpose specified.

Second, The combination of the plows, K, swinging bars, L, springs, N', and cam, M, constructed and operating substantially as described for the purpose specified.

59,078.—Plow.—J. L. Robarts, Brunswick, Ga.

I claim the detachable and reversible V-shaped land side, E, secured to the stock, C, substantially as shown and described.

59,079.—Water Drawer.—Cyrus W. Saladee, Newark, Ohio.

First, I claim the yoke, A A 1, constructed and operating in the manner and for the purpose substantially as shown and described.

Second, I claim the flange or spout, C, in combination with the yoke, A A 1, substantially as and for the purpose shown and described.

Third, I claim operating the yoke, A A 1, and buckets, B, by means of the lever, D, or its equivalent, as and for the purpose herein set forth.

Fourth, I claim holding the buckets, B, in position against the underside of the yoke by means of the spring or catch, P, or its equivalent, in combination with the groove, N, in the manner and for the purpose substantially as shown and described.

Fifth, I claim with four arms, K K K K, forming the bale of the bucket in combination with the cone, N, and yoke, A A 1, in the manner and for the purpose substantially as shown and described.

59,080.—Brick Machine.—James Sangster, Buffalo, N. Y.

First, I claim the openings, T T, be the number more or less, when placed within the portion of the sliding mold, B, where the brick or material receives its pressure.

Second, The opening, J3, in the bottom of the mold, B, for the purpose of leaving room for the escape of the surplus clay or material described.

Third, The openings, J1 and J2, in the lower part or sides of the pistons, as and for the purposes described.

Fourth, The pins, Z Z, or the equivalent thereof, when used in the mold, B, substantially as described.

Fifth, A piston moving and compressing the clay to the point desired which is then forced by the opposite piston with the brick partly compressed back again to a support, where it remains until the piston which moves it back gives the completing pressure to the brick.

Sixth, The employment of one or more plates, B, substantially as described.

Seventh, I claim the lifter, U, when constructed with the openings, B2 and B3, or the equivalent thereof, when used in combination with the plate, C1, substantially as described.

Eighth, The arrangement of the cam-connecting rod and the stationary guide, S, when used to give the irregular reciprocating motion of a brick machine.

Ninth, The combination of the pistons, H and H', as described and set forth.

59,081.—Hanging Carriage Body.—Henry Scharch, New York City.

I claim the attachment of the springs to the body, as and for the purposes set forth.

59,082.—Door Spring.—Reinhard Scheidler, Newark, Ohio.

First, I claim the tongue, C, in combination with the coils, e e, secured to the hugs, a a, in the manner described.

Second, Securing the inner straight ends of the spring coils, e e, to a stiff tongue, C, which is constructed substantially as described.

Third, The combination of the spring coils, e e, tongue, C, and retaining nuts, C' C', with the slotted box cover, B, substantially as described.

Fourth, Sustaining the inner end of the lever, C, upon the box, B, or its equivalent, by means of a curved flanch, f, formed on said lever, substantially as described.

59,083.—Apparatus for Drying Dishes.—C. W. Schroeder, New York City.

I claim an apparatus for drying dishes, etc., composed of a box or stand provided with one or more sets of shelves and intermediate heaters, substantially as and for the purpose described.

59,084.—Gate.—Charles Seefeld, Lomira, Wis.

I claim the arrangement of the platform, F, with the lever, E, with bar, D, so operated by weight on the platform, F, as to give the bar, D, the requisite inclination so that the gate opens and closes by its gravity.

59,085.—Hitching Clamp or Hold-fast.—James P. Senchair, Millport, N. Y.

I claim the hitching clamps, or hold-fast, constructed and applied in the manner described for the purpose specified.

59,086.—Medicine Chest.—Edward M. Skinner, Boston, Mass.

First, I claim constructing the chest or case in such a manner as to form, when the same is open, a series of shelves, substantially as and for the purpose specified.

Second, I claim the combination of a series of perforated shelves, C, with the s ides, D, as and for the purpose specified.

Third, I claim the combination with the chest, A B, constructed as described, of the perforated shelves, the slides, D, the compartments, b' E, and drawer, F, substantially in the manner and for the purpose described.

59,087.—Crib and Chair.—John E. Small, Berlin, Wis.

I claim the joints, b b, in combination with the end racks, c c, the folding side rack, E, and the pieces, d d, substantially as and for the purpose set forth.

59,088.—Sewing-machine Shuttle.—Earle H. Smith, Bergen, N. J. Antedated Oct. 7, 1866.

First, I claim a cylindrical shuttle formed of sheet metal, in combination with a bobbin inserted and removed from the side, substantially as described.

Second, The fixed curved guide for the shuttle thread, in combination with a slit in the shuttle, substantially as set forth.

59,089.—Transmitting Motive Power.—R. T. Smith, Nashua, N. H.

I claim the swivel stirrup, J, secured to the swinging rod, I, in combination with the cage, N, handle, O, and shaft, K, carrying the brush, cutter, or other article, and connecting with the shaft, K, in the stirrup, by bevel gear or other equivalent means, substantially as and for the purpose set forth.

59,090.—Button.—Charles F. Spencer, Rochester, N. Y.

I claim the plates or disks, d and e, in combination with the headed stem, b, attached to the button, the parts or pieces being constructed and operated substantially as herein recited.

59,091.—Churn Dasher.—N. H. Spencer, Canandaigua, N. Y.

I claim, First, Forming the dasher, A, in bowl shape, substantially as herein shown and described.

Second, Forming two or more valves in the upper part of the bowl-shaped dasher, A, substantially as herein shown and described.

Third, The combination of two or more ball valves, C, with the dasher, A, substantially as herein shown and described.

59,092.—Cap.—Christian and Frederich Stattmann, Chicago, Ill.

We claim, First, The employment of the reversible flap, A, in combination with a cap whose front and rear part are composed of different material, arranged and operating substantially as described and shown.

Second, We claim in a cap whose sides are slotted or separated as described, the employment of an elastic insertion or connection, D, substantially as and for the purpose specified.

59,093.—Machine for Scalding Hogs.—Matthias Stricker, Vincennes, Ind.

I claim the box or boiler, A A, combined with the swinging cradle for submerging a hog in the scalding water within, and turning the scalded hog out on a side bench or table by reversing the cradle, constructed and arranged substantially as herein described.

59,094.—Stitching Clamp.—William W. Taylor, Newark, N. J.

I claim, First, The combination of the toggle lever, D, with the lower end of the jaw or leg, A, of the clamp, and with the foot block, H, or equivalent, substantially as herein shown and described.

Second, The combination of the jointed arms, C, with the jaws, A and B, of the clamp, substantially as herein shown and described.

Third, An improved stitching clamp formed by the combination of the jaws, A and B, jointed arms, C, toggle lever, D, and foot block, H, or equivalent, substantially as herein shown and described.

59,095.—Wrapper for Needles.—Sineus E. Totten, Brooklyn, N. Y. Antedated Oct. 7, 1866.

I claim a wrapper for needles provided with a magnetic attachment, substantially such as herein described for the purpose set forth.

59,096.—Balanced Steam Valve.—Joseph Trent, Millerton, N. Y. Antedated Oct. 7, 1866.

I claim the above-described construction and arrangement of a tubular slide valve for steam or other engines, substantially as and for the purposes set forth.

59,097.—Barrel Hoop.—H. W. C. Tweddle, Allegheny, Pa.

I claim making metallic hoops for barrels, casks, and similar vessels, with the inner surface provided with longitudinal ridges so constructed as not to prevent the hoop being driven on the cask, while the projecting edge or edges thus provided cause it to remain in place when driven, substantially as hereinbefore described.

59,098.—Mode of Hanging Bells.—Ezra W. Vanduzen, Cincinnati, Ohio.

First, I claim a bell proper, having a crown opening, B, in combination with a yoke and crown plate, substantially as and for the purposes set forth.

Second, The arrangement of the flanged or collared yoke, C D, perforated crown plate, E, and two or more attaching bolts, F F, G G', for combination with an open-crowned bell, substantially as set forth.

Third, In the described combination the crown plate, E, attaching bolts, F F', and caps, H H', for the purposes stated.

Fourth, The crown plate, E, having a cast projection or spade handle, E, for the clapper, as and for the purpose set forth.

Fifth, The perforated crown plate, E, in the described combin-

ation with two or more attaching bolts, F F', as and for the purpose set forth.

59,099.—Mode of Hanging Bells.—Ezra W. Vanduzen, Cincinnati, Ohio.

First, I claim the arrangement of flanged and grooved yoke, C D E, of bossed and grooved crown plate, F G, the whole traversed by a single axial bolt, J, in the manner set forth.

Second, The combination of sockets, J, J', beneath the crown plate and rollers, I I, and set screws, M M', for the purposes explained.

Third, The bossed crown plate, F F, either with or without the tenon, G, and spade handle, I, as and for the purpose set forth.

59,100. — Bolt-heading Machine. — Benjamin Walker, Birmingham, Conn.

First, I claim the combination of the clamping heads, B', gage, A, and cutter, F, arranged substantially as described, whereby the blank is gaged, cut off, and clamped between the said heads, B', substantially as herein set forth.

Second, The dies, f', in combination with the heading dies and with the clamping heads, B', all arranged substantially as herein set forth for the purpose specified.

Third, The heading dies, z' s w, in combination with the clamping heads, B', and operating in succession, substantially as herein set forth for the purpose specified.

Fourth, The construction of the preparatory heading die, z', with convex inner sides and acute or recessed corners, substantially as herein set forth for the purpose specified.

Fifth, The vertically-sliding block, M, furnished with suitable heading dies, in combination with the horizontally-sliding block, K, and with the clamping heads, B', substantially as herein set forth, for the purpose specified.

Sixth, The arrangement of the sliding bars, G H, furnished at their inner ends with dies, f', the sliding bars, G' I, and the cams, G' I', in relation with each other and with the clamping heads, B', substantially as herein set forth for the purpose specified.

Seventh, The slide, C', furnished with the inclined plane, C and arranged in relation with the cutter, F, toggle bar, D', and slide, C, substantially as herein set forth for the purpose specified.

59,101.—Car Coupling. — Samuel J. Wallace, Carthage, Ill. Antedated Oct. 13, 1866.

I claim the arrangement at the end of the car of the horizontal shaft, A, arm, F, and link, G, operating the coupling pin, P, substantially as described.

In combination with the above, I claim the rising and falling coupling guide, L, operating as described.

59,102.—Grain-drying Kiln.—Nicholas Wallaster, Detroit, Mich.

I claim, First, The loader, D, formed by combining the sections or traps, G', the covers, dd, the bars, ds, and the screws, F, with each other and with the frame of the loader, substantially as described and for the purpose set forth.

Second, The arrangement and combination of the sections, g1 g2 g3, of the floors, constructed as described, in combination with each other, with the sides of the drying chamber, and with the arms, H, and rods, I and J, substantially as described and for the purpose set forth.

Third, The combination of the pipes, s s1 s2 s3, constructed and arranged as described, with the canals formed in the sides of the kiln, between its outer and inner walls, substantially as described and for the purposes set forth.

Fourth, The combination of the pipes, B', with the openings, A', in the outer wall of the kiln, and with the canal through which pass the pipes, s1 s2 s3, substantially as described and for the purpose set forth.

59,103.—Machine for Shearing Sheep. — A. Washburn and T. Brintnall, Sork, Ohio.

We claim, First, The swinging arm, E, with a counterbalance weight, substantially as described.

Second, The shaft or tumbling rod, J, with flexible connections, I K, operating substantially as described.

Third, The adjustable shield, B, covering the knives, and operating substantially as described.

59,104. — Machine for Making Sheet-metal Pans.—Orvill W. Way, Troy, N. Y.

First, I claim the employment and arrangement of the movable and adjustable dies or wings, B, in combination with a central and vertically-moving platform die, C, in the manner substantially as herein described and set forth.

Second, I claim the employment of the downward-moving platform or die, C, as the means for operating or working the said dies or wings, B, in the manner and for the purpose substantially as herein described and set forth.

Third, I claim the said die or wings, B, in combination with the sides, N, and the bevel regulators, P, in the manner and for the purposes substantially as herein described and set forth.

59,105.—Machine for Raking and Loading Hay. —Milo Webb, Chenango Forks, N. Y.

I claim the sleeves, F and G, attached to the wheels and arranged to operate in combination with the yoke, e, substantially as and for the purpose set forth.

59,106.—Apparatus for Spinning Direct from the Doffer of Carding Engines.—Thomas Welham, Philadelphia, Pa.

First, I claim the combination with the doffer, B, of a carding engine, of the adjustable spinner bed, R, as and for the purpose described.

Second, I also claim the combination with the doffer, B, of a carding engine, of the spinners, C, constructed and operating as and for the purpose described.

Third, I also claim the arrangement of the spinners, C, with inclosed rollers, S, the adjustable spinner bed, R, and spools, T, operating as herein described and for the purposes set forth.

59,107.—Hinge.—W. T. Wells, Decatur, Ill.

I claim the slotted leaf, M, of the hinge, B, in combination with the thumb screw, G, secured as described, and adapted substantially as and for the purpose specified.

59,108.—Truss Pad.—Thomas S. Wheeler, Boston, Mass.

I claim the improved joint or spring and pad connection made of the screw, a, the elongated head, b, and an elliptical cup or socket, c, arranged, applied together in manner, and so as to operate substantially as specified; and I also claim its combination with the spring and pad of a truss or abdominal suppo ter.

59,109.—Tanning.—George D. Wheelock, Freedom, Ohio.

I claim the within described process of tanning hides and skins, by treating the same successively with the liquors herein set forth.

59,110.—Double-barreled Fire-arm.—Eli Whitney, New Haven, Conn.

First, I claim the manner, substantially as herein described, of constructing the lock case, A A', in one piece, and with tang sockets or holes, b b d, and side apertures for plates, j j, for the purpose set forth.

Second, The combination of the pin, c, and the tangs of the breech piece in the construction of a double-barrel gun, as set forth.

Third, The combination of the removable perforated circular plates, j j, and shafts, g g, with the one-piece lock case, A A', substantially as described and for the purpose set forth.

Fourth, The construction of the perforated plate, j, with an offset, K, and passing the tumbler and hammer shaft through it, substantially as described.

Fifth, The arrangement of the partition, A', case, A, detached triggers, K K', sears, S S, and single pin, p, substantially in the manner and for the purpose described.

Sixth, The combination of the socket, d, with the sockets, b b, when the socket, d, is a continuation of the lock chamber, A, and said sockets, b b d, receive tangs, d' b' b', of the parts, C C D, substantially as described.

Seventh, The partition, A', within the case, A, constructed as specified, and serving in connection with the case, A, the several described functions, as set forth.

Eighth, The manner herein described of constructing the lock case, A A', in one piece, and with hard metal bearings, such as described for the purpose set forth.

59,111.—Fruit Can.—L. J. Wicks, Bridgeton, N. J., claims the lugs, covers and cross bar, substantially as arranged and described, and for the purposes set forth.

59,112.—Railways.—Swain Winkley, New York City.

I claim the construction of the base plates with notched corrugations, as described.

59,113.—Horse Rake.—John Wood, North Bloomfield, N. Y.

I claim the special arrangement of the spring stops, K K and o o, and the bar, C, provided with the double wedge, z, when the said parts are used in combination with the single handle, B, for controlling the rake head, operating as and for the purpose herein set forth.

59,114.—Portable Fence.—G. C. Wright, Westfield, Ohio.

I claim the herein-described construction of a fence, consisting of the boards, A, battens, B, blocks, C, braces, D, and pins, s, substantially as specified.

59,115.—Seed Planter.—Lewis R. Wright, Cohoes, N. Y.

I claim, First, The arrangement and combination of the levers, e i g h, with the sliding cylinder, I, and cog wheel, D, in the manner and for the purposes substantially as herein described and set forth.

Second, The arrangement of a cog wheel or cylinder, D, containing the series of cogs, a b c, upon or near each end of the driven shaft, B, and the shafts, G G, containing the sliding pinions, E E, and the planting cylinders, F F, each being arranged and combined in the manner substantially as herein described and set forth.

Third, I claim the mode herein described and set forth for combining and disconnecting two or more seed-planting machines, constructed and arranged substantially as herein described and set forth.

Fourth, The employment of the marking device, M, constructed and combined with the arm, L, hinged to the frame, A, in the manner substantially as herein described and set forth.

59,116.—Machine for Raking and Loading Hay. —R. Wright and J. Wright, Franklin township, Pa.

We claim the yielding rake head, g, in combination with an endless apron when used for raking hay and conveying it up into the hay wagon, in the manner herein described and set forth.

59,117.—Manual Power.—John H. Yager, Trenton, Ohio.

I claim the double brakes, b b and b' b', with their rock shafts, c c', and connecting rods, f and f' and g g g g', in combination with the vertical slots, m m and m' m', and the crank shaft, a a, the whole being constructed, arranged and operated substantially as and for the purposes herein described.

59,118.—Currycomb.—Willbur F. Arnold, Winthrop, Conn., assignor to himself and P. A. Gladwin, Boston, Mass.

I claim, as an improvement in currycombs, the employment of one or more springs, F, for throwing over and retaining the plate, D, upon the comb, substantially as set forth.

59,119.—Stove Door.—Solomon C. Batchelor (assignor to himself and W. C. Davis & Co.), Cincinnati, Ohio.

I claim a stove-door hinge composed of open backed sockets, C, with the described stepped upon portion in combination with the correspondingly stepped collar, E, of the pintle, as and for the purpose explained.

In combination with a stove-door hinge constructed as above specified, I further claim the lug, F, for the purpose set forth.

59,120.—Machine for Making Fishing Lines and other small Cords.—Peter Brooks (assignor to the National Line and Cord Co.), New Haven, Conn.

First, I claim the feeding bar, N, arranged upon the hollow shaft, a, and combined with the hollow shaft, d, and the thread guide, f, constructed and arranged to operate substantially in the manner and for the purpose herein set forth.

Second, The levers, h, in combination with the respective threads or which the line is formed and the twisting apparatus, constructed and arranged to operate substantially in the manner and for the purpose herein set forth.

59,121.—Safety Valve.—William Burnett, San Francisco, Cal., assignor to John C. Paige, Stoneham, Mass.

First, I claim the arrangement of the levers and their attachments, substantially as described and for the purpose specified.

Second, The lever weight so arranged that the lever passes through a recess within the body of the weight, substantially as described and for the purpose specified.

Third, The means herein described for relieving the valve of its load to test its operative condition.

Fourth, The arrangement substantially as described for securing the cover of the inclosing case.

Fifth, The cap provided to prevent the valve spindle from being wedged, substantially as herein described.

59,122.—Faucet.—William S. Cooper, Philadelphia, Pa., assignor to Cooper, Jones & Cadbury.

I claim the hollow projection, C, its spring, G, cap, F, annular packing piece, p, and collar, p, of the spindle, E, the whole being arranged substantially as and for the purpose herein set forth.

59,123.—Seed Drill.—H. V. Davis and George W. Peabody, Amherst, N. H., assignors to George W. Peabody, Amherst, N. H., and Charles B. Tuttle, Milford, N. H.

We claim the bar, A, having the reed box, D', secured upon its lower part, and the strips, B B, attached to its lower end and with the roller, C, between their rear ends and the furrow opener, E, at their front end, in combination with the fixed perforated plate, e, in box, D', and the reciprocating perforated plate, g, at the rear of plate, e, operated by the rod, E', and cam, D, from the axis of the roller, C, substantially as shown and described.

59,124.—Air-compressing Pump.—J. N. Dennison (assignor to himself and F. H. and R. J. Gould), Newark, N. J.

First, I claim a pump composed of two (or more) cylinders of unequal size provided with pistons connected together by a pipe with recess valves, as shown, in combination with an air supply pipe leading to the largest, and a discharge pipe leading from the smallest cylinders, substantially as and for the purpose herein set forth.

Second, The jackets, I I', communicating with each other by a pipe, m, and provided with a supply and discharge pipe, in combination with the cylinders, A C, and with or without an additional pump, n, substantially as and for the purpose described.

59,125.—Pump.—John N. Dennison (assignor to himself, Francis H. Gould and Roscoe J. Gould), Newark, N. J.

I claim so arranging the pistons of a pump composed of two cylinders having pistons secured to one and the same rod, that either or both can be put in operation or thrown out of operation, substantially as and for the purpose described.

59,126.—Magazine Fire-arm.—Valentine Fogerty (assignor to himself and Paul P. Todd), Boston, Mass.

I claim, First, The combination of the magazine tube arranged along the sides of the gun stock, as described, with the mechanism for delivering the forward cartridge to the breech pin or to the end of the barrel, substantially as herein shown and set forth.

Second, Making the magazine tube in two jaws laterally hinged to each other so as to permit the easy insertion of the cartridge into the feeding apparatus, and also allow the head of the cartridge to pass through the smallest part of the feeding magazine as described.

Third, The combination and arrangement of the breech pin, D, guard lever, G, arm or lever, K, and connecting rod, E, to give the required movements to the breech pin and magazine, as described.

Fourth, The plate, V, for opening and closing the lower end of the magazine, in combination with the lever, Y, for pressing open the sliding portion of the magazine, substantially as set forth.

59,127.—Waxed Thread Sewing Machine.—Thomas J. Halligan (assignor to himself and Samuel Shapter), New York City. Antedated June 14, 1866.

I claim the vertically-oscillating and laterally-sliding curved eye-pointed needle arranged above a perforated bed plate of a shuttle sewing machine, and operated substantially as described, for serving and feeding the material or work, as set forth.

Second, The combination of an awl with an eye-pointed needle, constructed, arranged and operated substantially as specified.

Third, The arrangement of a curved awl with a curved eye-pointed needle above a perforated bed plate of a shuttle sewing machine, and upon a carrier which receives a right-line movement, for the purpose of feeding the material, and curved movement in a vertical plane for the purpose of carrying the upper thread through and below the bed plate, substantially as described.

Fourth, The arrangement of the pressure foot and its rod with respect to the curved internally-sliding and oscillating needle, substantially as herein described and shown.

Fifth, The arrangement of the sliding rods, I and d, guide, H, joint eye, d', cam, D', spring, l, and set screw, j, substantially as and for the purpose set forth.

Sixth, The arrangement of the hinged devices, L L', lever, K, and pressure device, D D', substantially in the manner and for the purpose described.

Seventh, The pressure foot controlled by means of a cam, N, constructed and arranged as set forth, in combination with the perforating and feeding needle, substantially as described.

59,128.—Melodeon.—Frederick Hoddick (assignor to George A. Prince & Co.), Buffalo, N. Y.

I claim, First, A tremolo bellows, F, having inlet and outlet valves, f1 f2, constructed and operating substantially as herein described.

Second, A tremolo bellows, F, or its equivalent, placed and used in connection and combination with the wind chest and swell valve of reed musical instruments, for the purpose and substantially as described.

59,129.—Carpet Stretcher.—John Kelly (assignor to himself and W. H. Alexander), Canton, Ohio.

I claim a carpet stretcher composed of the teeth, hinged and adjustable levers, and cord, the whole being arranged to operate substantially in the manner and for the purpose described.

59,130.—Water Grate.—Wm. A. L. Kirk, Hamilton, Ohio, assignor to Owens, Lane, Dyer & Company.

I claim the tubular grate bars, Z, each provided with a longitudinal diaphragm, D, when the said grate bars are arranged beneath the fire box, and at the lower end of the water leg, A, of the boiler, in the manner and for the purpose herein specified.

59,131.—Stove-cover Lifter.—J. C. Longshore (assignor to himself and John Longshore), Mansfield, Ohio.

I claim the combination of a stove, Rd lifter, D, pincers, A B, pot, dish, pudding, etc. etc., lifter, F G, hammer, H, and tack puller, a, all in one implement, constructed substantially as shown and described.

59,132.—Hand Loom.—Stephen C. Mendenhall and Simon Sparks, Richmond, Ind., assignors to Stephen C. Mendenhall.

We claim, First, The peculiarly shaped cam, E e e' e'' e''', in the described combination with the grooved hub, F, constructed as described, and a series of treadles, 1 2 3 4, or more, constructed as described, whereby one cam is made to operate all the treadles, and also to keep the treadles depressed during almost the entire revolution of the cams.

Second, The rise, K, and stop, L, in the described combination with the grooved cam hub, F, as and for the purpose set forth.

Third, In combination with the cam, E e e' e'' e''', and hub, F, grooved or shown and described, we claim the retracting spring, G.

Fourth, The finger, I, hinged to the cross rail, H, and provided with a spring, J, for the purpose set forth.

Fifth, We claim in the described combination, the yielding and spring-sustained finger, I, and the spring catch, M, for the momentary detention of the finger outside of the hub, as set forth.

Sixth, We claim the releasing cam, O, in the described combination with the spring catch, N, and finger, I.

Seventh, We claim the combination of the grooved cam hub, F, and the yielding and spring-sustained finger, I.

Eighth, We claim the arrangement of the shouldered shaft, A a a', cam, E e e' e'' e''', grooved hub, F, rise, K, stop, L, releasing cam, O, spring catch, M, and retracting spring, G.

Ninth, In combination with the elements of the cams immediately preceding, we claim the sparred pulleys, C and D, winch, C', eyeleted belt or chain, B b, pitman, P P, and batten, Q.

59,133.—Clothes Rack.—John O. Montignani, Albany, N. Y., assignor to A. Turner.

I claim the construction of clothes pins for portable clothes racks by forming their axes or pivots as described.

59,134.—Machine for Folding Paper Collars. —Chas. E. Moore, Roxbury, Mass., assignor to Andrews A. Evans, Boston, Mass., assignor to New England Model Collar Company.

I claim, First, Folding collars by means of the angular groove, P, and die, N, substantially as described.

Second, The rollers, R and Q, arranged and operating in combination with the groove, P, and die, N, substantially as and for the purpose described.

59,135.—Manufacture of White Lead.—H. J. Overmann (assignor to Wm. S. Hascall), New York City.

First, I claim the manufacture of white lead from metal lead, or litharge, or ores of lead by means of nitric and sulphuric acids or their several equivalents, in combination with pyroligneous or oxalic or similar acids, with or without the use of borax or its equivalent, substantially as described.

Second, I also claim the use of pyroligneous or oxalic acid or similar acids for destroying the crystalline structure of the precipitated sulphate of lead, with or without the use of borax, or its equivalent, substantially as described.

Third, I also claim in the manufacture of white lead dissolving and precipitating lead or its compound at the same operation in one vessel, substantially as described.

59,136.—Trunk.—Elias B. Quick (assignor to himself and George T. Palmer), Brooklyn, N. Y.

I claim a trunk with a ventilator or ventilators attached, substantially as shown and set forth.

59,137.—Hoisting Machine.—Henry J. and James Reedy (assignors to James Reedy), Cincinnati Ohio.

We claim, First, The mode substantially as described of supporting and elevating a hoisting platform, I, by a single rope, P whose ends are secured to opposite extremities of the windlass H, while its bight or middle portion is rove through a sheave, O upon the platform for the purpose described.

Second, Counterbalancing a hoisting platform by a weighted cord, Q, which being carried horizontally over one end of the windlass traverses a sheave, S, and is carried back and secured to the windlass at or near its mid length and on the reverse side from the hoisting cable, P.

Third, The self-locking and releasing brake, U X, arranged and operating substantially as set forth.

Fourth, The provision of the serrated eccentrics, Y Y', spring bolts, Z Z', and stirrup, N, the whole operating as a safety check, in the manner explained.

59,138.—Circular Loom for Weaving Hats.—Phineas Leeson Slayton and Charles I. Kane (assignors to Almet Heed), New York City.

We claim, First, In a circular loom having one or more sets of weaving machinery elevating and depressing the upper series of partitions, a3, and their attachments, substantially as above described.

Second, We also claim elevating and depressing the ring, H, carrying the series of partitions, a3, and the ring, F, carrying the partitions, a', by means of the screws, S, or their equivalents, substantially as described.

Third, We also claim the use of fixed rack, U, or its equivalent, by which an independent motion is given to the separating wheels, q q', of the shuttle carriage, substantially as above described.

Fourth, We also claim the primary channel, O', beneath the shuttle carriage which receives and retains the stems of the warp carriers, r, until removed by the indicator rods, F, substantially as described.

Fifth, We also claim raising the warp carriers from the primary channel, O', into the path of the shuttle carriage by means of an indicating apparatus, made substantially as described.

Sixth, We also claim transferring the warp carriers from the lower part of the loom to the upper part, and vice versa, by means of the bridge shown in Figs. 9 and 10, or any equivalent device, substantially as described.

59,139.—Horse Hay Fork.—Seymour Rogers, Pittsburgh, Pa., assignor to Luman Rogers.

I claim the combination of the elevating rod, d (to which the hoisting rope is attached), having a barb, f, pivoted thereon, with the penetrator or sheath, a, and cam lever, i, constructed and operating substantially as hereinbefore described.

59,140.—Ditching Machine.—David Sawyer Webster, Ohio, assignor to himself and Robert Barber, Perrysburg, Ohio.

I claim, First, The wheels, B C D and H, and shaft, E, as arranged with shaft, F's and c', wheels, G G' and d d', for the purpose and in the manner set forth.

Second, The wheels, I and K, and sweep, M, as arranged with the wheels, c' d d' G G' and B C and D, for the purpose and in the manner described.

Third, The links, N, and lever, N', rod, O, and staple, P, as arranged, for the purpose and in the manner specified.

Fourth, The shaft, T, chains, W, and wheels, V', as arranged with the sheave, X, wheel, V, and frame, A, in the manner and for the purpose set forth.

Fifth, The bucket, b'', cutting edges, c'', in combination with the knife, g, spade, f, for the purpose as specified.

Sixth, Half d'', arm, d''' as constructed and operated by the cam, j, slide, l, and spring, O, for the purpose described.

Seventh, The bottom, C'', and arm, n, as arranged and operated by the cam, m, as, for and in the manner set forth.

Eighth, The adjustable cam, j, slide, l, and spring, r, as arranged for the purpose and in the manner specified.

59,141.—Cotton-bale Tie.—George A. Seaver, New Orleans, La., assignor to Alexander H. Seaver, Brooklyn, N. Y.

I claim making the inner sides of the link with a curved or angular form, substantially as described, for the purpose of holding the band by indenting its edges in addition to the transverse bending when it has been forced into position.

59,142.—Feeder for Carburetors.—Edgar M. Smith (assignor to Mitchell, Vance & Co.), New York City.

I claim, First, A cased or caged float and valve interposed between a supply barrel or cask, and the gas apparatus or machine, for the purpose of supplying automatically and in uniform quantities, the gasoline or other gas making material from the barrel to the apparatus, substantially as herein described.

I also claim the bent tube or pipe, d, extending from the cage to the gasometer or service pipe, as described.

59,143.—Piston Packing.—William G. Snook and O. C. Patchell (assignors to themselves and A. H. Gorton), Corning, N. Y.

We claim, First, The combination of the bolt or stem, J, perforated slide, K, and spring, N, with each other, and with the grooved part, E, ring, F and G, and perforated plates, B D, substantially as described for the purpose specified.

Second, The combination of the springs, L, and relief valve, M, with the port, C, of the piston head, substantially as described for the purpose specified.

59,144.—Cotton-bale Tie.—Charles Swett, Vicksburg, Miss., assignor to Charles G. Johnson, New Orleans, La. Antedated April 23, 1866.

I claim, as a new manufacture, my improved fastening block for uniting the ends of metallic bands, when said bands are made to embrace compressed bales of cotton, or other equivalent substance, substantially as herein set forth.

59,145.—Device for Forming the Eyes of Bed Springs.—N. B. White (assignor to himself and Henry B. Baker), Dedham, Mass.

I claim the combination of the two plates or jaws, C D, the stud, E, the shoulder, G, arranged substantially as described.

I also claim the combination of the two plates or jaws, C D, the stud, E, the shoulder, G, and the shoulder, F, arranged substantially as specified.

I also claim the combination of the recess, h, with the shoulders, F and G, and the stud, E, applied to the two plates, C D, as specified.

I also claim the combination of the plate, D, with the bending recess, e, arranged in it, as and for the purpose specified.

59,146.—Steam Generator.—James Woodford and William H. Bancroft, Portland, Wis., assignors to said Bancroft and W. L. Ward.

We claim, First, A boiler, D, when constructed with an internal fire chamber, F, flues, F1, and an internal flue, F2, and arranged substantially as set forth.

Second, In combination with a boiler, D, we claim a jacket, C, surrounding the wick tube, B, for heating the water before it is applied to the boiler, substantially in the manner set forth.

59,147.—Steam Generator.—James Howard and Edward Tenney Busfield, Bedford, England.

We claim, First, A series of tubes, a b c, coupled and connected, substantially as represented in Fig. 6, for the purpose set forth.

Second, Arranging the sections of tubes, substantially as herein described, to give access to the heating chamber.

Third, The screens, f, for directing the current of heated gases, and for allowing a free circulation of heat around the upper part of the sections of tubes, substantially as and for the purpose described.

59,148.—Telegraphic Signals.—Ralph A. Jones and Joseph Hedges, Aylesbury, England.

We claim an alphabet or characters composed of a long stroke used in conjunction with a dot and dash, forming the several characters of the Morse alphabet, substantially as and for the purpose described.

59,149.—Apparatus for Rectifying Alcohol.—Henri Lamotte, Percy street, Bedford square, England.

I claim the boiler, A No. 1 and A No. 2, and rectifying column or analyzer, B, in combination with the purifyers, F and G, the parts being connected by pipes and regulated by cocks or taps, in the manner and for the purposes set forth.

59,150.—Privy Seats.—Ernest Mangeon, Paris, France.

I claim the combination of the cover, D, valve, C, and mechanism by which the position of the cover governs the position of the valve, so that when either is open the other is closed, all being arranged in connection with the receiver, A, and conduit pipe, B, of a water closet or privy, substantially as herein set forth.

59,151.—Applying and Securing Metal Bands on Cotton Bales.—James J. McComb, Liverpool, England.

I claim, First, The peculiar form of the self-acting nipping ties or metal band lock for connecting the ends of metal bands surrounding cotton and other bales, as hereinbefore described and set forth, and forming the slots or holes through the same in an oblique direction, and also forming the holes or slots on one end a little narrower than the width of the metal band by forming the side or sides at an angle, substantially in the manner and for the purposes hereinbefore described and set forth, and

Lastly, The improved construction of grapple jointed to and operated by a hand lever having jointed prongs, substantially in the manner and for the purposes hereinbefore described and set forth.

59,152.—Cotton-bale Tie.—James J. McComb, Liverpool, England.

I claim the peculiar manner of holding the metal bands, x, as hereinbefore described by Figs. 1 and 2, substantially in the manner and for the purposes hereinbefore described as set forth.

59,153.—Device for Lowering and Detaching Boats from their Davits.—Carl Henrik Ramsten, Carlskrona, Sweden.

I claim, First, The hooks, D D, constructed substantially as described, of a lever, b, pivoted arm, c, and hook end, d, for operation essentially as and for the purpose herein set forth.

Second, The combination with disengaging hooks, as described, at or to opposite ends of the boat, of the connection between the hooks, as formed by the rod, E, and chains, m n, for action in the manner described.

Third, The stopper, F, in combination with the rod, E, chain, n, and lever, b, for operation together, essentially as specified.

Fourth, In combination with the gripe, H, the double-jointed hook, r s, constructed and arranged to hold the gripe when said hook is lashed by the fall but relieved therefrom when the fall is released, substantially as herein set forth.

59,154.—Composition for Forming Useful and Ornamental Articles.—Daniel E. Somes, Washington, D. C.

I claim the combination of the substances or their equivalents, as herein described.

59,155.—Pianoforte Action.—C. L. and A. B. Irving, Fort Wayne, Ind.

First, We claim the combination of two key boards with the octave couplers, constructed and operated in the manner and for the purpose substantially as set forth and described.

Second, We claim the jointed compound levers, n n', in combination with rod, m, and connecting rod, o, for the purpose specified, the whole being constructed substantially as set forth.

Third, We claim curved arm, i', in combination with key, A, and key, B, the same being constructed in the manner and for the purpose described.

REISSUES.

2,382.—Harvester.—Robert T. Campbell, Washington, D. C., assignee of T. N. Supton, Winchester, Va. Patented May 8, 1855.

First, I claim the application of a hinged diagonal brace, b, in front of the finger beam for the purpose of sustaining such beam against backward strain and thrust, substantially as set forth.

Second, Hinging a diagonal brace, b, which extends forward of the finger beam, so that its axis of motion shall coincide with the axis of motion of said beam, substantially as described.

Third, Sustaining the platform frame and the finger beam by means of a forward diagonal brace, b, and a rear brace, b2, substantially as described.

Fourth, A hinged brace which extends forward of the finger beam and is adapted to serve as a guard and also as a means of sustaining the finger beam against backward strain, substantially as described.

Fifth, A diagonal brace which is connected at one end to the finger bar and extended forward of the same and connected by an eye formed on it to the draft frame so as to move concentric with the axis of motion of said finger beam, substantially as described.

Sixth, Extending the brace, b, as claimed in the fifth clause of the claim, under the platform which sustains the fallen grain, substantially as described.

Seventh, An inclined shaft, K, supported in bearings, a a, upon the inder side of the draft frame, and adapted to serve as a driving shaft for the cutters and also as a means for hinging the finger beam to said draft frame and arranged with respect to a horizontal shaft, H, or equivalent, substantially as described.

Eighth, In combination with a vibrating finger beam which projects laterally from the grain side of a draft frame and which receives vibrating movements independently of the frame from the undulations of the ground over which it is drawn, I claim a reel, or its equivalent, mounted wholly upon the finger beam, or its platform, for gathering in the standing grain, substantially as described.

Ninth, In combination with the subject matter of the sixth clause of the claim, I also claim means which will carry off the cut grain from behind the cutting apparatus and deliver it from the inner side of the platform, substantially as described.

Tenth, In combination with a finger beam which vibrates independently of the main draft frame and is supported at its outer end upon the ground. I claim providing means which will enable the attendant, while riding upon the machine, to stop and start the cutting apparatus and the means employed for conveying the grain away from behind the cutting apparatus, substantially as described.

Eleventh, The employment of the cutters, d, placed on the rotating shaft, M, in combination with the two sets of fingers, P Q, the said parts being constructed and operating substantially as described.

Twelfth, Supporting a reel, or its equivalent, at its inner end by the hinge of the finger beam and at its outer end by a wheel, or other equivalent device, substantially as described.

Thirteenth, Supporting both, a device which removes the cut grain to one side of and away from behind the cutter, and a device which reels in the uncut grain to the cutting apparatus, by means of the axis, a, hinged at the inner end of the finger beam and a wheel equivalent at the outer end of such beam, substantially as described.

Fourteenth, Supporting a reel wholly upon the hinged finger beam or platform which receives the falling grain, in combination with applying the finger beam thus wholly carrying the reel, to one side of the draft frame in such manner that the finger beam and reel together will be supported at one end by a hinge connection and by a wheel, or its equivalent, at the other end, substantially as described.

2,383.—Treating Wood, Straw, etc., for the Manufacture of Paper Pulp.—The Hydrostatic Paper Company, Rochester, N. Y., assignees by mesne assignments of Henry L. Jones and D. S. Farquharson. Patented June 5, 1866.

We claim the subduing of straw, wood, or any fibrous material to be converted into pulp by subjecting the same to the action of alkali liquor of any desirable temperature applied under the hydrostatic pressure of the liquid itself, applied by a force pump or otherwise instead of using steam pressure preparatory to the bleaching of such material in the ordinary method, substantially as described.

Second, We claim the combination with the cylinder, A, of the pump, D, and pipe, B, substantially as and for the purpose above set forth.

Third, We claim the safety valve, K, in combination with the pump, D, below the piston or plunger and in direct communication with the pump barrel, substantially as above described.

2,384.—Apparatus for Bleaching Paper Pulp.—The Hydrostatic Paper Company, Rochester, N. Y., assignees by mesne assignments of Henry L. Jones and Duncan S. Farquharson. Patented March 13, 1866.

We claim, First, Bleaching the material to be converted into paper, by subjecting the same to the action of bleaching liquor, applied under pressure, substantially as described.

Second, We claim the combination with the cylinder, A, of the pump, D, and pipe, B, substantially as and for the purposes set forth.

Third, We claim the combination with the cylinder, A, of the elevated reservoir, E, and pipe, F, substantially as and for the purposes set forth.

Fourth, In combination with the cylinder, A, pump, D, and pipe, F, we claim the valve, O, for relieving the pressure of the liquid, as explained.

DESIGNS.

2,495.—Floor Oil-cloth Pattern.—Charles T. Meyer, Bergan, N. Y., assignor to E. C. Sampson.

2,496.—Ornamenting Children's Long Combs.—Leonce Picot, Hudson, N. J., assignor to the Rubber Clothing Company of New York City.

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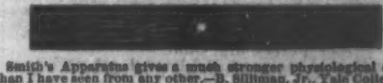

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We hear there are manufacturers infringing on some one or more of our nine patents in this machine. We caution the public from purchasing such.
All communications must be addressed "Combination Molding and Planing Machine Company, cor. 1st ave. and 24th st., New York, where all our machines are manufactured, tested before delivery, and warranted.
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TREATMENT OF SUGAR CANE.—The Subscriber, owing to his feeble health, would like to sell, or engage with parties for the sale or use of his process for extracting syrup from cane, patented Aug. 28, 1866. The syrup made by my steaming Process is considered equal to Golden Syrup, and sells readily at the same price. With a single apparatus one man can prepare in one day enough for 75 gallons of syrup. The patent is unquestionably very valuable, and reliable parties can make favorable terms by immediate application to 16 5* J. C. BELL, Patentee, Pawnee City, Nebraska.

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Office of William Sellers & Co.,
Philadelphia, Aug. 15, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—We have your favor of the 9th inst., and may say in reply, that we have now had the "Harrison Boiler" in constant use in our Works for nearly two years. It has given us great satisfaction. We consider it quite as economical in the use of fuel as any boiler we have used, or with which we are acquainted, and are satisfied that it is much safer than any boiler made.
Yours truly,
WM. SELLERS & CO.

Philadelphia Rolling Mill,
Kensington, Philadelphia, Aug. 13, 1866.

Mr. Joseph Harrison, Jr.:
Dear Sir:—I will say in reply to yours of the 9th inst., that I have had one of your Boilers almost in constant use over one of my Puddling Furnaces for over eighteen months, and in all that time it required no repairs, with the exception of changing a few light bolts for heavier ones, and it is now running without any signs of leaking or want of repair, apparently as good as when first put up. I think I have just grounds, from the experience I have had, to recommend them as a good and safe boiler, and one that generates steam very fast. I feel confident that I get nearly double the quantity of steam from this boiler that I do from any other Puddling Furnace in my Mill that has two Cylinder Boilers over them. I believe the day is not far distant when they will be in general use in Iron Manufacturing establishments.
Yours respectfully,
STEPHEN ROBBINS.

Artisan Hall, 611 and 613 Sansom street, Philadelphia.

Mr. Joseph Harrison, Jr.:
Dear Sir:—We take great pleasure in testifying to the merits of your Boiler, as a generator of steam, the confidence we have in its safety, its economy of fuel, and also of space for its erection. It has now been in successful operation more than a year, without the necessity of any repairs, and our confidence increases with its use. We shall always consider it a privilege to exhibit and explain its merits to any who may wish to examine it.
Respectfully, etc.,
GEO. W. SIMONS, BRO. & CO.

Philadelphia, Aug. 9, 1866.

Mr. Joseph Harrison, Jr.:
Dear Sir:—In reply to your communication respecting our opinion of the "Harrison Boiler," we would state as follows: We have had one of your Boilers in constant use for twenty-two (22) months, during which time it has supplied steam to a 9-inch Engine, driving about seven lathes and several other power tools. It is perfectly tight and free from leakage; takes up less room than an ordinary Boiler; and as to its economy in fuel, you can best judge for yourself, from the following statement: During the past year it has burned from 50 to 60 tons Pea Coal each week averaging 5½ to 7 days. We can truly recommend said Boiler, from our own experience, as safe, reliable, and economical.
Truly yours,
TAWS & HARTMAN, 1227 North Front street.

Office of the Salem Coal Company,
Philadelphia, August 16th, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—After having your cast-iron Boiler in use at the Colliery of this Company for more than a year, it gives me pleasure to state that its operation has been very satisfactory. In the important point of economy of fuel it is reported to be superior to any other Boiler we have in use, and as regards its safety from destructive explosion, it certainly has no equal among all the various forms of boilers that have come under my notice.
Very truly,
JNO. C. CRESSON, Pres't.

Germantown, Aug. 15, 1866.

Mr. Joseph Harrison, Jr.:
Dear Sir:—About four months ago, we put in one of your "Harrison Boilers," and it gives us much pleasure to be able to state that, as a safe steam generator, in its general economy in fuel, time, etc., we consider it the best Boiler now in use. Our Boiler is 80 horse-power; our Engine has a 16-inch cylinder, with a 36-inch stroke; the cost of running this, and almost always at its utmost capacity, is about two dollars per day. In fact, we consider your Boiler so excellent in its service, aside from its exemption from explosion and its real economy, that we could not and would not do without it. It will afford us much pleasure to show the "Harrison Boiler" to any one who may call at our Works, where they can daily see it in practical operation.
Very truly yours, etc.,
NELSON, CROOK & CO.,
Manufacturers of Edge Tools, Hammers, etc., Armat-st., Germantown, Philadelphia.

New York, August 15th, 1866.

Mr. Joseph Harrison, Jr., Philadelphia, Pa.:
Dear Sir:—We take pleasure in informing you that the Boiler purchased from you, which we have had in use about five months, has given the best satisfaction, and has borne out everything you claimed for it. As a steam generator we have never seen anything equal to it. We consider the saving of fuel as being very great compared to ordinary boilers. If we had need of more steam capacity, we should most certainly use your Harrison Boiler in preference to any other. You are at liberty to use this, if it will be of any service to you. Yours truly,
UNITED STATES WATCH CO., F. A. GILES, Pres't.

Pennsylvania Hospital for the Insane,
Philadelphia, August 11, 1866.

My Dear Sir:—In my annual Report of this Institution, for 1865, I stated my high estimate of your Boiler, for safety, economy, and general efficiency. Additional experience has tended to confirm all that I then said, and if we required additional Boilers, for any purpose, I should certainly recommend yours.
Very truly yours,
THOMAS S. KIRKBRIDE.
Jos. Harrison, Jr., Esq., Philadelphia.

Philadelphia, Aug. 10, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—The "Harrison Boiler" we bought of you, some four months ago, has given us perfect satisfaction. The Boiler is placed over one of our heating furnaces, and, in consequence of the steam-pipe connections with our main steam pipe, we have no means of testing its economy in fuel. We believe it to be safer and more economical than the Cylinder Boiler, and have no hesitation in recommending it as admirably adapted for Rolling Mills. The length, the same as the length of a heating furnace, enabled us to place it immediately over the furnace, requiring no additional space, thus avoiding the necessity of locating the furnaces at an inconvenient distance from the machinery, which the ordinary Cylinder Boiler requires.
Very truly yours,
VERHAE & MITCHELL.

Philadelphia, Aug. 15th, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—Before ordering one of your Boilers, we sought information respecting them from several of our friends who were using them. Their testimony was of such a character that we felt no hesitation in adopting it, and it has more than answered our expectations. We recommend them as safe, very economical, and easily managed; they possess fully all the advantages you claim for them.
Very respectfully yours,
L. MARTIN & CO.,
Manufacturing Chemists, City Office 140 South Wharves.

Atlantic Mills, Elwood, Atlantic county, N. J.,
August 13th, 1866.

Mr. Joseph Harrison, Jr.:
Dear Sir:—We have had one of your Six-slab Boilers in use in our Paper Mill for five months. We consider it unequaled by any other make of boiler now in use. With less than one-half the fuel it produces more and drier steam than any boiler we ever used. It is simple, easily managed, and perfectly safe. Our Boiler bleaches the stock for, and dries one ton of paper daily, with one cord of pine wood per day.
Very truly,
McNEIL, IRVING & RICH.

Mercantile Printing Rooms, Franklin Building,
Philadelphia, 14th Aug., 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—I am very much pleased with the Boiler you put in for me some nine or ten months ago. It has been in constant use—no trouble—no repairs—no stopping to clean out, and steam can be "got up" in about twenty minutes. It requires less coal than the Cylinder Boiler formerly used here, although it is doing a great deal more work. I cheerfully recommend it as being and doing all that you claim for it.
Yours very respectfully,
JAMES B. RODGERS.

Daily Evening Bulletin,
Philadelphia, Sept. 1, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—We have one of your 81 Horse-power Globular, Five-slabbed Boilers, known as the "Harrison Boiler," in use now nearly two months, and as a safe, reliable steam boiler, and for economy of fuel, we think it cannot be equaled.
We have a ten horse-power engine, running eight hours per day, with an average saving of 30 per cent in the use of fuel over the old-style boiler. Our Engineer, Mr. George Lodge, has had over thirty years' experience in the management of boilers, and he has no hesitation in pronouncing the Harrison Boiler the "Best" he ever worked.
Very respectfully yours,
EVENING BULLETIN ASSOCIATION, 607 Chestnut-st.

Earle Stove Company,
Worcester, Mass., Sept. 3, 1866.

Joseph Harrison, Jr.:
Dear Sir:—Before purchasing your boiler, we examined with much care the various kinds now in use, determined to get "The Best." After eight months' trial, our experience conclusively confirms the correctness of our judgment in making choice of yours. Our President (T. K. Earle), and Treasurer (Edward Earle), who have in their Card Factory, one of the best of tubular boilers, are now putting in one of yours. We refer you to our Engineer, Mr. Frederick Edwards.
Truly yours,
EARLE STOVE CO., SIDNEY SMITH, Supt.

Worcester, Mass., Sept. 3d, 1866.

After an experience of twenty years in running the most approved boilers and engines in use, I regard the Harrison Boiler, made by Joseph Harrison, Jr., of Philadelphia, the most economical for fuel, safest, quickest working, and one that will give the steadiest motion to the engine with the least attention.
FREDERICK EDWARDS, Engineer,
Earle Stove Co., Worcester, Mass.

Worcester, Mass., 9th mo., 6th, 1866.

Joseph Harrison:
Dear Sir:—We received your letter, and in answer will say, we are highly gratified with Boilers. The one we are using at the Earle Stove Co. has been in operation, since the first of the year, in perfect order. We have just got in operation the last sent, at our Card Factory, and are running it beside a Tubular Boiler of about the same capacity: so far we find a saving of about one-half by actual measurement.
Truly yours
T. K. EARLE & CO.

Alpine Mills, Howards, Center county, Pa.,
September 8, 1866

Joseph Harrison, Jr., Esq.:
Dear Sir:—It gives me great pleasure to be able to inform you that your Boiler comes up to the most sanguine expectations; in fact, all that you can possibly claim for it; being economical, safe, and a speedy generator of steam. Since they were first put up in the spring (which, by the way, was done without having a mechanic on the ground, except the mason), according to your plans, sent gratis, the first leak, trouble, or delay has yet to make its appearance. Steam is kept up from 75 to 90 lbs. for Wm. H. King's (1015 Sansom street), 25 horse-power Oscillating Engine, with saw dust, there being but a 25-feet iron stack of 2 feet diameter. . . .
I am, dear Sir, yours very respectfully,
PERCY H. WHITE, Agent.

Lincoln Mills,
S. W. cor. 25th and Spruce streets, Philadelphia, Sept. 10, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—In reply to your letter of the 9th ult., I would say that I have been using the "Harrison Boiler" for more than two years, and it gives me great pleasure to state that I find it entirely satisfactory. I have had both Cylinder and Tubular Boilers in use, and have consequently been able to compare each of them with yours. I have two of your boilers of 75 horse-power each in use, and my engine is 70 horse-power. I do not require more than 50 lbs. of steam, but would not hesitate to run up to 200 lbs., if necessity required me to do so. I had each of the slabs tested in my presence to 600 lbs. to the square inch. I know that it requires less fuel than the best of either the Cylinder or Tubular Boilers. My neighbor, with about the same machinery, using the steam for power generally, and heating his Mill with exhaust steam, informs me that he burns four tons of coal per day under his Cylinder Boiler, while I need less than two tons per day during the coldest days of last winter, and heated my Mill with live steam, in addition to the amount required for power. The question of durability is one of time. I think that in consequence of the ease with which it can be cleaned or repaired, that it will last far longer than any other kind now in use. It is perfectly safe. There is no danger whatever of explosion. I do not hesitate to recommend it. If I ever need another boiler, I will get one of yours in preference to any other that I now have any knowledge of.
Yours truly,
SAMUEL W. CATTELL.

Superintendent's Office, Camden and Atlantic Railroad,
Camden, N. J., Aug. 21, 1866.

Joseph Harrison, Jr.:
Dear Sir:—You ask our opinion of the safety, economy in fuel, and general merit of the Harrison Boiler we have in use. I deem it a safe Boiler; from its construction I do not think it possible that a disastrous explosion can occur. It is a rapid generator of steam, and requires less fuel than any boiler that has come under my notice. . . . . .
Very respectfully yours,
G. W. N. CUSTIS, Supt.

Philadelphia, Aug. 10, 1866.

Joseph Harrison, Jr., Esq.:
Dear Sir:—Having charge (as administrators) of the Worsted Mills of the late Mr. Samuel Yewdall, at which the recent terrible explosion of a wrought-iron boiler occurred, we have decided to avoid a recurrence of such a calamity in the future, and, believing your Boiler to be the only one absolutely free from danger from explosion, and at the same time superior as a steam generator of steam, and in economy of fuel, to any boiler now in use. You will please accept our order, to furnish us for said Mills, two fifty horse-power Boilers, to be used separately or in conjunction. By complying quickly with the above order, you will very much oblige,
Yours truly,
JAMES HUNTER, } Administrators.
N. B. SUPLEE, }

Rock Island Manufacturing Company,
Charlotte, N. C., August 29, 1866.

Mr. Joseph Harrison, Jr.:
Dear Sir:—Our experience with your Boiler warrants us in bearing testimony to its superiority over any other with which we are acquainted. Ours is a 100 horse-power boiler, and drives six sets of woolen machinery, and furnishes steam for our dyeing operations, and for heating the mill. Our fuel is wood, and we use three cords per day to do all our work, whereas, we formerly used that quantity under Cylinder Boilers, merely to furnish steam for our dye house, and heating the mill. Our experience is, that in fifteen minutes after applying the fire in the morning, we have on a full head of steam, and our machinery at work. We have had it in use only a few months, it is true, but we presume long enough to test its adaptation to our fuel and our work, and have found it in every respect to come up to your representations. Our Boiler was set up and put to work by a man who never had seen it done, without the slightest difficulty. Your Boiler commends itself for economy in fuel, and its merits need only to be known to render it universally popular.
Very respectfully yours,
14 4] JOHN A. YOUNG, President.

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Improved Patent Station Indicator.

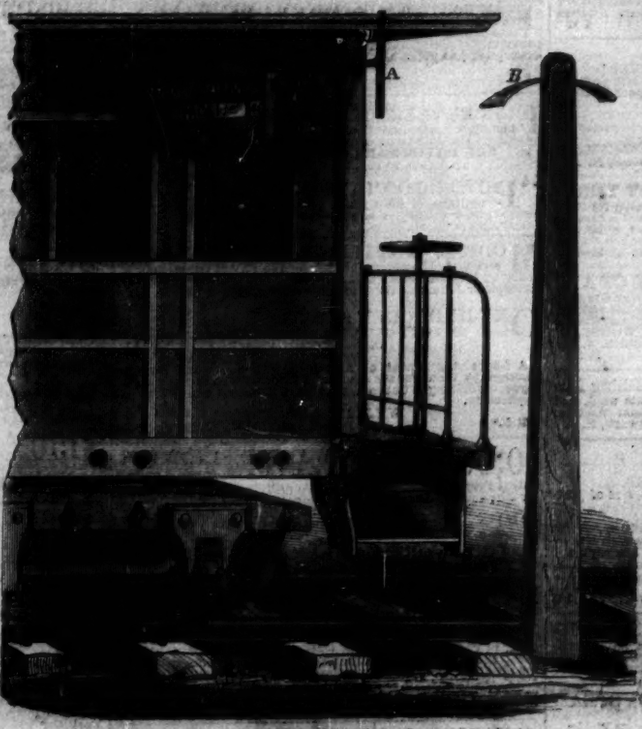
The ordinary way of giving railway passengers notice of their arrival at stations, is by the call of the conductor or brakeman at the door of a car. Generally this call is given while the train is in motion, and the noise of the cars frequently drowns the voice of the conductor, or renders his direction indistinct. Then the difficulty of getting ready to leave the train on such short notice is one of a serious character. For these reasons persons are often carried beyond the point of their destination.

To obviate these difficulties is the design of the device herewith illustrated. The apparatus is a box, containing a simple mechanism, operated by a lever, which, by means of a ratchet and pawl, moves an endless band, bearing at equal distances the names of stations, with the distance between the two termini.

The engraving represents one of these indicators in a car, the side of which is broken away to expose the apparatus. A lever A, projects through the side and is operated by the post and incline, B, at the side of the road. As the car passes a station, the incline turns the lever and presents the direction, "the next station is ——." If, on a car backing, it again passes the post, this action is reversed, so that the apparatus is self-operating, or automatic, and always correct. A bell can be attached to the indicator to call the attention of the passengers to its operation.

When the car has run the route and is ready to return, the indicator is to be unhooked and hung at the rear end of the car, now become the forward end, when the action of the posts by the road-side will reverse its action giving a correct indication of the stations.

This device was patented April 3, 1866, by P. E. and J. P. Gruger, Lancaster, Pa., to whom apply for the purchase of rights or for further information.



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The Photographic Art.

Sir David Brewster, in a recent address on the claim of science and art to national recognition and support, indulges in the following beautiful remarks concerning the photographic art:—

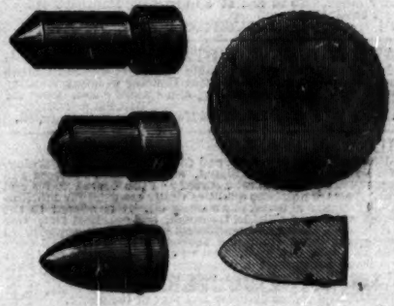
But while the artist is thus supplied with every material for his creative genius, society derives a still greater boon. The home-faring man, whom fate or duty chains to his birth place, or imprisons in his fatherland, will without fatigue and danger, scan the beauties of the globe, not in the deceitful image of a hurried pencil, but in the very picture which would have been painted on his retina had he been magically carried to the scene. The outlines of the Himalayas and the Andes will stand before him in their most favored aspect. The Niagara will pour out her mighty cataract of waters, while the dreaded volcano will toss into the air her clouds of dust and fragments of fire. At a lower altitude, Egypt's colossal pyramids will rise before him; the temples, too, of Greece and Rome, and the gilded mosques and minarets of the East. With a more affectionate gaze he will survey the hallowed scenes which faith has consecrated and love endeared. Mount Zion will stand before him "as a field that is plowed," Tyre as a rock on which "the fishermen dry their nets," Nineveh "made as a grave," and Babylon the great "cast up as a heap," covered with pools of water, and without even the "Arab's tent" or the "shepherd's fold." Yet, though, it is not only Palestine in desolation that we see; the seas which bore on their waves the Divine Redeemer, the hills which bounded his view, the pathway which he trod, and the mount from which he spoke the message of salvation, stand unchanged, and appeal to us with immortal interest.

Molds for Casting Iron, Steel, etc.

Mr. Frederick Tachsel, analytical chemist, and Mr. Wm. Hall, brass founder, of Manchester, England, have patented certain improvements made by them in molding for casting steel, iron, and other metals. According to the usual process of molding for casting, it is well known that sand is employed which is more or less siliceous, the silica of which, when submitted to the melting temperature of certain metals, becomes fused and combines with said metal. This invention consists in substituting for the aforesaid sand, a material which does not substantially contain free silica, lime, or other material which will fuse at the melting temperature of the metal to be cast. With this view, materials with an aluminous base, having been previously reduced to a state of powder, are employed in the place of the usual sand, and after the ordinary manner of molding. As illustrative of the invention, coal shale or fire-clay, ground, when dry, to a powder, may be used as above described.—*Railway Times.*

PECK'S PATENT PATCHED BULLET.

There has been much discussion of the comparative merits of breech and muzzle-loading rifles. The patch used on the ball in the muzzle-loader causes a smooth, even fit in the barrel, renders leading impossible, prevents friction and irregular



motion, and cannot be dispensed with in close shooting. It seems to be conceded that if the ball used in the breech-loader could be thus patched, it would add to its other merits all the accuracy of the muzzle-loader.

It is claimed for the invention herewith illustrated that it answers all the requirements of a perfect patched bullet, and can be used with equal facility in a breech or muzzle-loading rifle, but is more especially adapted to metallic cartridges for breech-loaders, and that it can be manufactured at a very slight advance upon the cost of the naked bullet.

The engravings represent the bullet in its various stages of manufacture. A is the slug as first cast. The nick, at B, is to receive the margin or edges of the patch, represented at C. This patch may be of cloth, paper, or parchment. The patch and slug are placed in a matrix, and a die compresses the metal, securing the patch smoothly around the base of the bullet, as seen at D. Another operation by means of the compression of dies, gives the finished form of E. At F is represented a vertical longitudinal section of the finished projectile, showing exactly how the patch is secured. From specimens, we judge this mode of patching to be very superior. It makes a very handsome projectile.

This improvement was patented July 19, 1864, by Milo Peck, New Haven, Conn., whom address for further information.

Petroleum and Sperm Oil as Lubricators.

The *Engineering* says that an American correspondent states that on the Boston and Worcester, and the Boston and Maine railroads, experiments have been made with petroleum and sperm oil to determine which is the best as a lubricator. The results were as follows:—

They put a railway carriage on each line in perfect order, calipered the journals and weighed the brasses, and used only sperm on one truck and only petroleum on the other of each carriage. After running the carriage 19,000 miles, all the axles and brasses were found in good order, with equal wear all round, and 20 per cent less oil had been used from the petroleum cask. They now use petroleum exclusively in the Lightner boxes of their carriages.

This oil, of the best quality, fully equal to pure sperm oil at the least, and probably better for carriage axles, can now be bought for 50 cents per gallon; and can be laid down in Liverpool at 2s. per gallon. Sperm is worth $2 85, and must be worth four or five times as much as petroleum in Liverpool.

The cause of the great depression in price here just now is the sudden and enormous supply of this lubricating oil obtained in Western Virginia, said to be 1,000 barrels per day, while the consumption in this country is only about half as much. The export trade in this quality of oil has yet to be opened.

MECHANICS

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